REPORT
PHASE 1 HYDROGEOLOGIC EVALUATION
PROPOSED GOLF COURSE WELL SITE
CITY OF ROCK ISLAND
ROCK ISLAND, WASHINGTON

FEBRUARY 25, 2009

FOR VARELA & ASSOCIATES, INC.

GEOENGINEERS O



File No. 16399-001-03



February 25, 2009

Varela and Associates, Inc. 601 West Mallon, Suite A Spokane, Washington 99201

Attention: Jesse Cowger

This letter transmits four copies of our "Report, Phase 1 Hydrogeologic Evaluation, Proposed Golf Course Well Site, City of Rock Island," Rock Island, Washington. Our services were completed in general accordance with the following:

- Our Agreement between Engineer (Varela) and Geotechnical Engineer (GeoEngineers) for Professional Services, dated July 25, 2007; and
- Our proposal dated August 20, 2008 (GeoEngineers Project No. 16399-001-03), which was authorized on August 29, 2008.

We appreciate the opportunity to provide these services. Please contact the undersigned should you have any questions or require additional information.

Respectfully submitted,

GeoEngineers, Inc.

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Senior Principal

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# Report Phase 1 Hydrogeologic Evaluation Proposed Golf Course Well Site City of Rock Island Rock Island, Washington File No. 16399-001-03

February 25, 2009

Was

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# REPORT PHASE 1 HYDROGEOLOGIC EVALUATION PROPOSED GOLF COURSE WELL SITE CITY OF ROCK ISLAND ROCK ISLAND, WASHINGTON FOR VARELA & ASSOCIATES

#### INTRODUCTION

This report presents results of our evaluation of the feasibility of siting a new groundwater production well at the proposed Golf Course Well site (Golf Course Site) in Rock Island, Washington. The Golf Course Site is located approximately as shown in the Vicinity Map, Figure 1.

The City's water supply system currently includes four groundwater production wells (Wells 1 through 4), two of which are currently used for potable water supply (Wells 2 and 3). These wells are completed in and withdraw water from an unconfined sand and gravel aquifer located adjacent to the Columbia River. The concentration of arsenic in groundwater pumped from the City's primary production well, Well 3, generally exceeds the drinking water standard of 10 parts per billion (ppb). The arsenic concentration in groundwater pumped from Well 2 is below the drinking water standard. However, Well 2 contains nitrate at a concentration that exceeds 5 milligrams per liter (mg/l), which is the action level for nitrate in groundwater. For these reasons, the City is considering improvements to the water system to develop a long-term source of groundwater that meets applicable drinking water standards. The improvements and actions could include treatment, blending, purchase of potable water from adjacent purveyors, and/or siting and development of one or more new production wells.

Documentation of GeoEngineers' previous hydrogeologic investigation associated with the City's production wells include the following:

- A report entitled Groundwater Production Well Evaluation, City of Rock Island, Rock Island, Washington, dated September 11, 2007. This report summarizes a review of background hydrogeologic and groundwater quality information for the area, a hydrogeologic reconnaissance, and the inspection, rehabilitation, and testing of existing Well 2. It also recommended that a comprehensive groundwater sampling program be conducted to identify those portions of the aquifer that would provide suitable groundwater quality (and the portions of the aquifer that should be avoided). The city implemented our recommendations during fall 2007.
- A letter entitled New Production Well Siting, City of Rock Island Washington, dated December 5, 2007. This letter summarizes our recommendations regarding potential new production well sites within the City, based on results of the City's groundwater quality testing program.

Based upon our December 5, 2007 letter, access considerations and other site selection criteria, the City chose the proposed Golf Course Site for further study to assess feasibility of siting a new groundwater production well at that location. During a subsequent public meeting regarding the City's selection, we understand that a citizen indicated the proposed new well location is situated about 800 feet northwest of a historic dump and/or refuse burning site. During a conference call with Varela Associates, Inc. (Varela) and GeoEngineers on March 17, 2008, the Washington State Department of Ecology (Ecology) indicated they would consider writing a variance to allow a new well to be constructed within 1,000 feet of the

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dump site (which would be considered an un-permitted landfill) if results of a hydrogeologic study indicated groundwater quality at the subject site is not likely to be impacted by the former dump site.

#### **SCOPE OF SERVICES**

GeoEngineers prepared a letter, dated July 24, 2008, that provided a project approach for evaluating the feasibility of developing a new groundwater production well at the Golf Course Site. That project approach was approved by the Rock Island City Council during a meeting on August 14, 2008.

This report pertains to Phase 1 of our hydrogeologic investigation, and generally consists of an environmental review, monitoring well installation, groundwater sampling and chemical analysis, and limited hydrogeologic analyses. Phase 2 services will consist of test/production well installation, hydraulic testing, and expanded hydrogeologic analyses, the results of which will be submitted under separate cover.

The purpose of our Phase 1 services was to perform an environmental review, monitoring well installation, groundwater sampling, and analyses as a basis for preliminarily evaluating the feasibility of developing a new groundwater production well at the Golf Course Site. Our specific scope of services consisted of the following:

#### **ENVIRONMENTAL REVIEW**

- 1. Review readily available aerial photographs and maps within an approximate 1,000-foot radius of the suspected dump site (review area) to identify potential sources of groundwater contamination.
- 2. Conduct a visual reconnaissance of the area surrounding the proposed well site to identify and locate potential sources of contamination.
- 3. Review historical town directories to evaluate development within the review area relative to the generation, storage, leakage, release and/or disposal of hazardous materials, or other potential sources of contamination.
- **4.** Review lists of abandoned landfills in the vicinity of the review area. Ecology, EPA and abandoned landfill lists were reviewed for indications of potential groundwater contamination sources or remedial actions.
- 5. Review the results of a federal, state, local and tribal environmental database search provided by an outside environmental data service for listings of sites with known or suspected environmental conditions on or near the subject property within search distances specified by GeoEngineers.
- **6.** Interview selected current and former property owners, when possible, regarding past or proposed land-use activities within the review area, if appropriate.
- 7. Provide a list of identified potential sources of groundwater contamination within the review area.

#### **MONITORING WELL INSTALLATION**

- 8. Prepare technical specifications for the drilling and installation of three monitoring wells (MW-1 through MW-3), for incorporation into contract documents prepared by Varela.
- 9. Assist Varela and/or the city in evaluating the technical aspects of contractor submittals.
- 10. Observe the drilling contractor during execution of the work described in the technical specifications.

- 11. Examine representative soil samples obtained from split-spoon samplers at an approximate 5-foot-depth interval during drilling operations.
- 12. Perform a combination of visual, water sheen, and photoionization detector (PID) screening of encountered subsurface materials for evidence of contamination.
- 13. Perform laboratory testing to assess pertinent physical characteristics of soil encountered.
- 14. Measure static groundwater levels in the installed monitoring wells.

#### **GROUNDWATER SAMPLING**

#### Initial

- 15. Collect an initial set of groundwater samples from monitoring wells MW-1 and MW-3 in general compliance with the U.S. Environmental Protection Agency's (EPA) low-flow groundwater sampling procedures.
- 16. Measure water quality parameters during well purging procedures, including pH, conductivity, turbidity, dissolved oxygen concentration, and oxidation-reduction potential.
- 17. Submit initial samples under standard chain of custody procedures to the City's preferred laboratory (Cascade Analytical, Inc. of Wenatchee, Washington) for analysis of the full suite of chemical parameters required by the Washington State Department of Health (DOH) for new water supply wells. This included inorganic compounds (IOCs), volatile organic compounds (VOCs), synthetic organic compounds (SOCs), bacteria, and radionuclides.
- 18. Evaluate initial groundwater analytical results with respect to relevant groundwater quality criteria.
- 19. Recommend additional analyses necessary to confirm and/or supplement initial sampling results.

#### Supplemental

- 20. Collect a supplemental set of groundwater samples from monitoring wells MW-1 and MW-3 in general compliance with the U.S. EPA's low-flow groundwater sampling procedures.
- 21. Measure water quality parameters during well purging procedures, including pH, conductivity, turbidity, dissolved oxygen concentration, and oxidation-reduction potential.
- 22. Submit the sample from monitoring well MW-1 under standard chain of custody procedures to Anatek Labs, Inc. of Spokane, Washington (Anatek) for the following analyses:
  - Total and dissolved iron, manganese, and arsenic concentrations by EPA Method 200.8.
  - Total trihalomethanes (THMs) by EPA Method 524.2.
- 23. Submit the sample from monitoring well MW-3 to Anatek for analysis of total and dissolved iron, manganese, and arsenic concentrations by EPA Method 200.8.

#### Analysis and Reporting

- 15. Calculate static groundwater elevations, hydraulic gradient and groundwater flow direction.
- **16.** Preliminarily estimate the geometry of the proposed new well's capture zone using assumed hydraulic parameters and analytical modeling techniques.

17. Develop conclusions regarding 1) the potential for the unconsolidated aquifer underlying the proposed well site to sustain a high-yield groundwater production well, 2) existing groundwater quality in the shallow unconsolidated aquifer underlying the proposed well site and the suspected former dump site and 3) the potential impact on groundwater quality at the proposed new well site from contaminants associated with the suspected former dump site.

#### **ENVIRONMENTAL REVIEW**

#### **GENERAL**

GeoEngineers conducted an environmental review of the area within an approximate 1,000-foot radius of the suspected former dump site to identify potential sources of groundwater contamination. This review area encompasses portions of the Rock Island Golf Course as well as the proposed well site and reported burn site.

#### SITE RECONNAISSANCE

A representative of GeoEngineers completed a visual reconnaissance of the subject area surrounding the proposed new well site on September 9, 2008. Whitey Evenhus, Rock Island City Councilman and former Mayor, accompanied our representative during the reconnaissance. The approximate locations of the features observed during our site reconnaissance and discussed in this section are shown in Observed Features, Environmental Review, Figure 2. Selected photographs of the review area are presented in Site Photographs – September 2008, Figure 3 and Figure 4.

Conditions observed during our site reconnaissance are summarized in Table 1.

**Table 1. Summary of Site Reconnaissance Observations** 

	Observed		
Feature	Yes	No	Comment
Structures (existing)	х		Multiple structures associated with the Rock Island Golf Course are located in the study area. These include a house, clubhouse, and maintenance sheds.
Structures (evidence of former)		Х	
Heating/Cooling System		Х	The golf course buildings likely use electric heat.
Floor Drains, Sumps or Drywells		X	
Aboveground Storage Tanks (ASTs)	x		Two ASTs were observed adjacent to the north end of the Golf Course's equipment maintenance shed. The tanks (one containing gasoline and one containing diesel) each have a capacity of approximately 675 gallons. Both appeared to be in generally good condition with minimal staining visible on the surrounding ground surface.
Underground Storage Tanks (USTs) or Evidence of USTs		x	No evidence of USTs (fill ports or vent pipes) was observed; however, an UST was reportedly formerly located adjacent to the west side of the equipment storage shed.

	Observed		
Feature	Yes	No	Comment
Drums or Other Containers		Х	
Chemicals or Hazardous Materials (other than de minimis quantities of cleaning products)		x	
Evidence of Leaks, Spills or Releases Surrounding ASTs, USTs, and/or Chemical Storage Areas		×	
Stained or Corroded Floors, Walls or Drains (other than apparent water stains or minor oil stains on pavement from parked vehicles)		x	
Pipes of Unknown Origin or Use		X	
On-site Septic System		X	Golf course likely uses a septic system for wastewater treatment/disposal, but we were unable to confirm the location of the drainfield at the time we completed this report.
Sewage Disposal System		×	
Potable Water Supply	X		Municipal and private water supply.
Solid Waste Refuse Dumpsters		X	
Hydraulic Hoists		×	
Oil/Water Separators		X	
Discolored or Stained Soil or Vegetation Potentially from Hazardous Substances		Х	
Hazardous Waste Disposal Areas		X	
Uncontained Debris, Refuse or Unidentified Waste Materials		X	
Standing Water or Other Liquids		х	
Catch Basins and Storm Water Drainage	×	-	An old culvert structure (two low concrete head walls and a culvert pipe surrounding a low ditch) was observed northeast of the golf course. According to Mr. Evenhus, this system was designed to retain runoff, during rain events, from the slope and roadway to the north.
Pits/Ponds/Lagoons	1	×	
Waste or Wastewater Discharges		×	
Unusual Odors	-	×	
Stressed Vegetation		X	Vegetation and grasses in the area of the proposed former burn area appeared more scrubby and sparse than at the adjacent Golf Course; however, this could likely be due to lack of irrigation in this area and natural vegetation conditions at the time of our site reconnaissance (late summer).
Fill Material		Х	
Water Wells (agricultural, domestic, monitoring)		X	An irrigation well is located on the property north of Saunders road, northwest of the proposed well site.

	Obse	rved	
Feature	Yes	No	Comment
Pad-Mounted Transformers		Х	
Pole-Mounted Transformers		X	
Other Conditions of Environmental Concern		Х	

#### **ENVIRONMENTAL RECORDS REVIEW**

GeoEngineers reviewed the results of a search of pertinent environmental regulatory lists and databases for current or previous facilities listed at addresses located within ASTM International (ASTM)-specified distances from the subject property. The database search was completed on September 4, 2008. The information was provided by a subcontracted regulatory list search service, Environmental Data Resources, Inc. (EDR). The entire EDR report is presented in Appendix A. The report includes details regarding the listed facilities identified and maps showing the approximate locations of the listed facilities relative to the subject property.

GeoEngineers reviewed the search results for listings within the applicable search distances from the Golf Course Site. GeoEngineers also reviewed an EDR listing of database entries that could not be mapped because of insufficient addresses (orphans). Off-site facilities within the specified distances from the Golf Course Site were evaluated for potential impact to the site.

No facilities or businesses within the specified search distances from the site were identified that, in our opinion, could pose a risk to the Golf Course Site. Those facilities listed in the EDR report either are located a significant distance from the Golf Course Site or are located in an inferred down- or crossgradient position relative to the site, and are unlikely to pose a potential environmental concern, in our opinion.

Because some of the "orphan" sites identified in the EDR report could not be mapped, we contacted Roger Johnson with Ecology's Central Records office on September 4, 2008, to verify the location of these orphan sites. Mr. Johnson gave more complete location data and we concluded that all of the orphan sites listed in the EDR report are located more than 1 mile from the subject property. Therefore, we believe that none of these sites are likely to pose a potential environmental concern for the subject property, and we did not review Ecology files for any of these sites.

#### **PROPERTY HISTORY**

#### Historical Resources

Our understanding of the history of the subject property is based on a review of the information obtained from the resources listed in Table 2 as well as interviews with the individuals listed. A collection of the historical aerial photos reviewed during this investigation is provided in Appendix B.

Table 2. Historical Resources Reviewed

Description	Provider or Interviewee	Dates of Coverage or Dates of Knowledge of the Property	Date Reviewed or Contacted	Comment (See Section 4.2 for findings)
Historical Aerial Photo- graphs <sup>1</sup>	EDR	1983, 1990, 1996, and 2006	09/05/2008	See note 1 below.
Historical Aerial Photo- graphs <sup>1</sup>	Douglas County	1949 and 1994	09/05/2008	See note 1 below.
Historical Fire Insurance Maps	EDR	No coverage	09/09/2008	Sanborn Fire Insurance maps do not exist for the subject property vicinity.
Historical City Directories	EDR search at public libraries	No coverage	09/09/2008	Historical City directories do not exist for the City of Rock Island
Historical Topographic Maps	EDR	1912, 1914, 1966, and 1975	09/04/2008	
City Council Meeting Minutes	Rock Island City Hall	May 8, 2008	09/09/2008	
Interview	Russell Clark, City of Rock Island Mayor	1960s-presemt	09/09/2008	Mr. Clark is a lifelong resident of Rock Island and is currently the Mayor.
Interview	Whitey Evenhus, City of Rock Island Councilman	1950s-present	09/09/2008	Mr. Evenhus is a long-time resident of Rock Island and was formerly Mayor for many years.
Interview	(b) (6) Rock Island Resident	1950s-present	09/11/2008	(b) (6) has been a long-time resident of Rock Island and had been active in the community for a long period of time.
Interview	(b) (6) Rock Island Resident	1950s-present	09/09/2008	(b) (6) (b) (6) If the reported dump site and gave a statement regarding the dump site at the May 8 city council meeting. As of the completion of this report, Mr(b) (6) has not yet responded to our request for additional information regarding his comments from the May 8 city council meeting.
Interview	(b) (6) Former Rock Island Mayor	1950-present	09/15/2008	Mr. (b) (6) was mayor and city council member in the 1960s, during the time the golf course was constructed.
Interview	Chelan Douglas Health District, Environmental Health Department	Recent	09/12/2008	At the time we completed this report, the Chelan Douglas Health District had not responded to our request for information regarding the former burn site.

Notes:

<sup>1</sup> The scale of the photographs reviewed allowed for an interpretation of general property development/configuration, such as identifying most structures, roadways and clearings. However, the scale of the photographs did not allow for identification of specific property features, such as fuel pumps, wells or chemical storage areas on the subject property, if any.

#### HISTORICAL PROPERTY USE SUMMARY

The available historical sources indicate that the area surrounding the current Rock Island golf course was generally undeveloped until the golf course was constructed in the mid-1960s. However, residents of Rock Island have reported that a small area located southeast of the golf course, along the west side of Hammond Lane, was used as a burn site by Rock Island residents from at least 1950 until the early 1960s.

We recorded from the interviews conflicting accounts as to what was burned or dumped at this location. While Mr. Evenhus, (b) (6) and (b) (6) all adults at the time the site was in use) stated that the burn site was mostly used to dispose of household yard waste and that it was burned frequently, (b) stated at a May 2008 city council meeting that this location was also used for dumping miscellaneous items including items from a chemical plant located over a mile to the west. Although we have been unable to contact (b) (6) directly, the minutes for this city council meeting state that he remembered 'car bodies, trash, or potties with rubber stoppers that were full of chemicals' dumped at the site by various operators, and that 'they would wake in the morning to find 55-gallon drums dumped over the bank and his eyes burning'. He also stated that 'the dump went from the top of the hill to the driveway at the end of the cul-de-sac'. However, Mr. Evenhus stated that the burn site was much smaller than disclosed by (b) (6) as shown on Figure 2.

Unfortunately, given the scale of the available aerial photographs and topographic maps we reviewed for this report, we cannot confirm the presence or extent of the burn site. Mr. (b) (6) was involved with the closure of the burn site prior to construction of the existing golf course in the early or mid 1960s and stated that when it was closed, it was buried by at least 4 to 6 feet of soil from a nearby topographic high area. Mr. (b) (6) also stated that when it was closed, he did not recall seeing any dumped equipment or auto parts—only ash, brush, paper, and other similar household trash items.

#### GEOLOGIC AND HYDROGEOLOGIC SETTING

#### GENERAL

This summary of geologic and hydrogeologic setting was developed by review of readily-available information from the literature, water well reports on file with Ecology, our experience near the study area, and hydrogeologic reconnaissance. Geologic conditions within and surrounding the City are presented in Surficial Geology, Figure 5. Descriptions of pertinent geologic units are provided in Table 3.

#### **GEOLOGIC SETTING**

The city is situated within an old meander, or oxbow, of the Columbia River. The ancestral trace of the river can be observed through the numerous sloughs situated along the northern margin of the city. The Columbia River now flows in a southeasterly direction immediately south of the City within a reach impounded by the Rock Island Dam.

Surficial geology within the Columbia River valley near and within the city of Rock Island generally consists of Quaternary (deposited less than about 1.5 million years ago [MA]) glaciofluvial and mass wasting deposits, with minor alluvial sediments. Glaciofluvial deposits generally consist of unsorted mixtures of silt, sand, gravel, cobbles and boulders deposited during Pleistocene (less than about 10,000 years) catastrophic flooding events. In the Rock Island area, these flood deposits are occasionally interbedded with glaciolacustrine sediments that were deposited in a low-energy depositional environment (such as a lake); these deposits typically consist of clay, silt, or silty fine sand.

Mass wasting deposits generally consist of landslide material, talus, and colluvium composed of unsorted Quaternary sediments and angular basalt fragments. Alluvial deposits generally consist of silt, sand, and gravel deposited by the Columbia River and its tributaries.

Glaciofluvial deposits form two prominent terraces within and surrounding the city. The upper terrace, which is situated at about Elevation 1,200 feet (elevations in this report are referenced to the National Geodetic Vertical Datum of 1929 [NGVD 29]), forms the upland along the northern margin of the city and extends east to the city of East Wenatchee. The majority of the City of Rock Island is situated on the lower terrace, which is at about Elevation 700 feet.

Quaternary sediments are underlain by a relatively thick sequence of basalt flows and interbedded sediments associated with the Columbia River Basalt Group (CRBG). The CRBG was deposited during an extended period of Miocene (23 to 5 MA) volcanism that extruded a series of very fluid lava flows. The lava flowed from north-northwest trending fissures as much as 90 miles long which were located primarily in northeastern Oregon and southeast Washington. The resulting basalt deposits are hundreds to thousands of feet thick, contain numerous sedimentary interbeds and extend throughout the Columbia Plateau. The CRBG has been subdivided into five formations that include, from oldest to youngest, the Imnaha Basalt, Picture Gorge Basalt, Grande Ronde Basalt, Wanapum Basalt, and Saddle Mountains Basalt. The Grande Ronde Basalt, which is the most voluminous of the CRBG formations and comprises 85 to 88 percent of the total volume, underlies the Rock Island area. The Grande Ronde Basalt is exposed along slopes to the east and south of the city.

Depth to, and geologic characteristics of basement rocks within the area are poorly understood. Based on the geology of adjacent areas, we suspect that basement rocks underlie the CRBG and largely consist of pre-Tertiary (older than about 65 million years) metasedimentary and plutonic rocks.

#### HYDROGEOLOGIC SETTING

Mass wasting deposits, alluvial sediments, and basement rocks typically are of limited utility from a water supply perspective because of limited aquifer thickness and/or transmissivity. In the Rock Island area, glaciofluvial sediments and, potentially, the CRBG are of primary importance for groundwater exploration and development.

The glaciofluvial aquifer generally is unconfined in the Rock Island area and typically consists of relatively free-draining sand and gravel with relatively high hydraulic conductivity and transmissivity. The Washington State University College of Engineering Research Division (1982) provided a range in transmissivity of  $5 \times 10^3$  to  $2 \times 10^5$  gallons per day per foot for the glaciofluvial aquifer in the Rock Island area. Saturated aquifer thickness varies from less than 10 feet along boundaries with bedrock and mass wasting deposits to more than about 180 feet within the interior of the city.

The Washington State University College of Engineering Research Division (1982) monitored glaciofluvial aquifer groundwater elevations within the Rock Island area during the period from August 1973 to November 1974. Groundwater elevations within the city generally were higher than the stage of the Columbia River, indicating the city is adjacent to a gaining reach of the Columbia River. Groundwater flow direction during this period generally was to the southeast, though during the irrigation season (about April to September) cones of depression on the groundwater table associated with wells supplying local orchards caused local variation in groundwater flow direction.

The glaciofluvial aquifer is relatively susceptible to degradation from point and non-point sources of contamination because of the lack of an overlying confining unit and a generally shallow depth to the

groundwater table. Recharge to the glaciofluvial aquifer is primarily from precipitation, applied irrigation, septic systems and potentially through leakage from the CRBG. The glaciofluvial aquifer discharges to water supply wells, sloughs, and the Columbia River.

Within the CRBG, groundwater is most readily transmitted through the broken vesicular and scoriaceous interflow zones that characterize the top of each basalt flow. Significant water-bearing zones also are encountered within relatively coarse-grained (sand and gravel) sedimentary interbeds. This system of multiple flows and interlayered sedimentary deposits creates multiple stacked confined to semi-confined aquifers which can yield significant volumes of groundwater to wells.

Recharge to the CRBG occurs through direct precipitation, vertical infiltration from overlying unconsolidated aquifers, and lateral recharge from up-gradient areas to the north and east. Discharge from the CRBG occurs through leakage from overlying unconsolidated aquifers, along gaining reaches of streams, and to water supply wells.

#### DRILLING AND MONITORING WELL INSTALLATION

#### GENERAL

Soil and groundwater conditions were explored by drilling three soil borings, designated MW-1 through MW-3, at the approximate locations presented in Monitoring Well Locations, Figure 6. The purposes of the borings were to define hydrostratigraphic and groundwater quality conditions within the glaciofluvial aquifer 1) at the proposed new well site (MW-1), 2) at the suspected dump site (MW-3), and 3) about 400 feet northwest of the suspected dump site (MW-2).

Borings were drilled on December 2 through 10, 2008 by Gregory Drilling, Inc. of Redmond, Washington (Gregory) using a combination of hollow-stem auger and mud rotary drilling methods. Depth of the borings ranged from about 75 feet in MW-3 to about 101 feet in MW-1. (Depths in this report refer to existing grade.) Standard Penetration Testing (per ASTM Method D 1587) was conducted at approximate 5-foot-depth intervals during drilling. Two-inch-diameter poly vinyl chloride (PVC) monitoring wells were installed within each boring.

A total of four soil samples were submitted to GeoEngineers' laboratory for analysis of grain-size distribution per ASTM Method C 136 and moisture content by ASTM Method D2216-90. Descriptions of GeoEngineers' field exploration equipment and procedures, exploration and monitoring well construction logs, and results of laboratory testing are provided in Appendix C.

#### **SURFACE CONDITIONS**

Monitoring wells MW-1 through MW-3 are located within the eastern portion of the City, southwest of the intersection of Saunders Road and Hammond Lane (intersection). Each monitoring well was drilled on property owned by the Rock Island Golf Course.

Monitoring well MW-1 was drilled within an undeveloped portion of the golf course situated about 30 feet south and 200 feet west of the intersection. The ground surface near monitoring well MW-1 is covered with short grasses. Surface elevation near MW-1 decreases to the southwest, towards a pond associated with an active sand and gravel mining operation. Monitoring well MW-1 is situated about 250 feet northeast of the pond boundary.

Monitoring well MW-2 was drilled within the parking lot associated with the golf course's clubhouse area, about 300 feet south and 250 feet east of the intersection. At the time of drilling, the surface of the parking lot consisted of gravel and contained about five to ten vehicles associated with golf course employees and their patrons.

Monitoring well MW-3 was drilled within an undeveloped portion of the golf course about 400 feet southeast of the club house area. MW-3 is located about 80 feet west of Saunders Road. At this location, an active orchard is situated along the east boundary of Saunders Road. The ground surface near monitoring well MW-3 is covered with short grasses. We did not observe any surficial evidence of prior dumping and/or burning activity in the area surrounding monitoring well MW-3.

#### SUBSURFACE CONDITIONS

#### Lithology

Relatively uniform subsurface conditions were observed to the depths explored in the borings. Two general soil units and one rock unit were encountered, including: 1) surficial silty sand, 2) glaciofluvial sand and gravel and 3) basalt.

The surficial silty sand unit only was encountered in boring MW-2, consisted of brown, silty fine sand, and extended to a depth of about 9 feet below ground surface at our boring location. The glaciofluvial sand and gravel unit was present at each boring location, and consisted of variably-colored sand and gravel with less than about 12 percent fines (silt- and clay-sized soil particles passing the U.S. No. 200 sieve), and occasional cobbles and boulders. We observed the glaciofluvial sand and gravel to depths of at least 101 feet in boring MW-1 and 75½ feet in MW-2, where these borings were terminated. We encountered glaciofluvial sand and gravel to a depth of about 65 feet in boring MW-3, where it was underlain by dark gray, vesicular, relatively unweathered basalt.

#### **Groundwater Conditions**

We observed the glaciofluvial aquifer at each of the three boring locations where it is unconfined. During drilling operations, we encountered the water table associated with the glaciofluvial aquifer at depths of about 32 feet in MW-1, 38 feet in MW-2, and 29 feet in MW-3. Given these depths to the groundwater table and approximate depth to the bottom of the glaciofluvial sediments, we estimate an aquifer thickness that ranges from about 36 feet at MW-3 to at least 69 feet at MW-1.

Two-inch PVC monitoring wells were installed within each of the three borings. Each monitoring well was screened across portions of the glaciofluvial aquifer. Monitoring well MW-1 was screened from a depth of about 75 to 95 feet to enable monitoring of groundwater quality conditions within the lower aquifer, in which proposed test/production well would most likely be screened. Monitoring wells MW-2 and MW-3 were screened across the groundwater table, at depths of about 35 to 55 feet and about 25 to 45 feet, respectively. These two monitoring wells are designed to enable monitoring of groundwater quality conditions within the upper portion of the glaciofluvial aquifer, which is most likely to be impacted through infiltration of contamination associated with the suspected dump site.

We measured groundwater levels within monitoring wells MW-1 through MW-3 on December 15, 2008. Groundwater levels were compared to wellhead elevations (provided by Varela) to develop the groundwater elevations summarized in Table 4.

Table 4. Groundwater Elevations - December 15, 2008

Monitoring Well Number	Wellhead Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)
MW-1	649.29	32.24	617.05
MW-2	652.45	35.42	617.03
MW-3	646.64	29.63	617.01

Groundwater elevations and approximate groundwater flow direction are presented graphically in Groundwater Elevations – December 15, 2008, Figure 7. We interpret that groundwater flows to the southeast across the study area under an approximate hydraulic gradient of about 4 x 10<sup>-5</sup> feet per foot (about 0.2 feet per mile). Within the context of the hydrogeologic setting of the site, this extremely shallow (low) gradient generally is indicative of a transmissive aquifer, or one that is characterized by relatively high volumes of groundwater flow and high groundwater velocities.

#### **Environmental Screening**

We screened collected soil samples for the presence of contaminants using a minimum of two of the following field methods: 1) visual examination; 2) water sheen testing; and 3) headspace vapor testing using a PID. Note that minor headspace vapor readings can be attributed to variations in temperature, and moisture content, and presence of natural organic mater, and are not necessarily indicative of the presence of volatile contaminants. Screening procedures are described in detail in Appendix B.

In our opinion, no evidence of environmental contamination was encountered during field screening of samples collected from borings MW-1 and MW-2.

No visual evidence or sheen was observed during screening of samples collected from boring MW-3. However, PID measurements ranged from 4.8 to 22.3 parts per million (ppm) in soil samples collected from about 50 to 65 feet below ground surface in this boring. These measurements could be indicative of the presence of volatile organic compounds in soil and/or groundwater. The presence of volatile organic compounds in groundwater at this location was tested by sampling and laboratory analysis, the results of which are described in the *Groundwater Quality* section of this report.

#### **GROUNDWATER QUALITY**

#### **GENERAL**

Groundwater samples were collected from monitoring wells MW-1 and MW-3 consistent with the EPA low-flow groundwater sampling procedure, as described in EPA (1996) and Puls and Barcelona (1996), and summarized in Appendix C. Water quality parameters, including pH, temperature, specific conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential were monitored during purging to enable us to assess when stable conditions necessary for sampling were prevalent.

Two groundwater sampling events were completed, including an initial event on December 15, 2008 and a supplemental event on February 2, 2009. Groundwater samples were submitted to selected analytical laboratories under standard chain-of-custody procedures. Results of our analytical data review, as well as copies of original laboratory certificates, are included in Appendix D.

#### INITIAL SAMPLING

GeoEngineers collected groundwater samples from monitoring wells MW-1 and MW-3 on December 15, 2008 and submitted the samples to Cascade Analytical, Inc. of Wenatchee, Washington for analysis of IOCs, VOCs, SOCs, and radionuclides.

Analytical results indicate groundwater quality in monitoring wells MW-1 and MW-3 generally is good. Specific results of the analyses are summarized below:

- The results of each IOC analysis, with the exception of iron and manganese concentrations, indicate compliance with drinking water standards for those analytes.
- The iron concentrations reported for monitoring wells MW-1 and MW-3 (5.90 and 1.80 milligrams per liter [mg/1], respectively) exceed the drinking water standard of 0.3 mg/l.
- The manganese concentrations reported for monitoring wells MW-1 and MW-3 (0.132 and 0.158 mg/l, respectively) exceed the drinking water standard of 0.05 mg/l.
- We believe that these iron and manganese results were impacted by an anomalously high
  concentration of suspended solids in the collected samples and are not reflective of the iron and
  manganese concentrations that we would anticipate for a fully developed water supply well
  installed in these locations.
- The arsenic concentration in the groundwater sample collected from monitoring well MW-1 (7.8 micrograms per liter [μg/l]) is slightly less than the respective drinking water standard (10 μg/l). This result likely also was impacted by the suspended solids concentration in the sample.
- Nitrate concentrations in the groundwater samples collected from monitoring wells MW-1 and MW-3 were 3.71 and 1.04 mg/l, respectively.
- Each VOC, SOC, and radionuclide analysis is in compliance with respective drinking water standards.
- Relatively low concentrations of three THM compounds (chloroform, bromodichloromethane, and chlorodibromomethane) were reported for the sample collected from monitoring well MW-1. In water samples, THMs typically are disinfection by-products (DBPs) associated with the treatment (chlorination) of drinking water in public water supply systems. We understand that Gregory used treated drinking water for the mixing of drilling mud and borehole flushing. Therefore, we suspect that these THMs were introduced into the well during the drilling and well development process.

#### SUPPLEMENTAL SAMPLING

Based on initial sampling results, GeoEngineers completed supplemental groundwater sampling in monitoring wells MW-1 and MW-3 for analyses of total and dissolved iron, manganese, and arsenic, and in monitoring well MW-1 for analysis of THM. Groundwater samples were filtered in the field to remove suspended solids and, therefore, more accurately reflect water quality conditions that can be anticipated for a fully developed water supply well.

Specific results of the supplemental analyses are summarized below:

- The concentrations of total and dissolved iron in samples collected from both monitoring wells were in compliance with (below) the drinking water standard. Dissolved iron in the groundwater sample collected from MW-1 (the proposed production well location) was not detectable.
- The concentrations of total and dissolved manganese in the samples collected from monitoring well MW-1 were in compliance with the drinking water standard. Dissolved manganese was not detectable.
- The concentrations of total and dissolved manganese in the samples collected from monitoring well MW-3 (0.110 and 0.106 mg/l, respectively) exceeded the respective drinking water standards.
- The concentrations of total and dissolved arsenic in the samples collected from monitoring well MW-1 (6.18 and 5.51 μg/l, respectively), represent decreases of about 21 and 29 percent, respectively, relative to the initial sampling result.
- Chloroform was detected at a concentration of 0.62 µg/l in the groundwater sample collected from monitoring well MW-1, which represents a decrease of about 79 percent relative to the initial sampling result. None of the other THMs were detected. This result supports our belief that potable water used by Gregory temporarily impacted water quality at the locations of monitoring well MW-1.

#### **SUMMARY OF RESULTS**

Analytical results for selected contaminants of concern (COCs) are summarized in Table 5. A complete tabulation of results is provided in Appendix B.

**Table 5. Selected Groundwater Quality Results** 

		Monitoring Well MW-1		Monitoring		
Parameter	Unit <sup>1</sup>	Initial Sample (12/15/08)	Re-Sample (02/02/09)	Initial Sample (12/15/08)	Re-Sample (02/02/09)	Drinking Water Standard
Total Iron	mg/l	5.90	0.167	1.80	0.241	0.3
Dissolved Iron	mg/l	NA	<0.01	NA	0.0126	0.3
Total Manganese	mg/l	0.132	0.0124	0.158	0.110	0.05
Dissolved Manganese	mg/l	NA	<0.001	NA	0.106	0.05
Total Arsenic	μg/l	7.8	6.18	2.7	1.77	10
Dissolved Arsenic	μ <b>g/l</b>	NA	5.51	NA	1.91	10
Nitrate	mg/l	3.71	NA	1.04	NA	10
Chloroform	μg/l	3.0	0.62	<0.5	NA	80 <sup>2</sup>
Bromodichloromethane	μ <b>g</b> /l	1.9	<0.5	<0.5	NA	80 <sup>2</sup>
Chlorodibromomethane	μg/l	1.4	<0.5	<0.5	NA	80 ²

#### Notes:

NA = Not analyzed

Bolded concentrations exceed the respective drinking water standard.

<sup>&</sup>lt;sup>1</sup> mg/l = milligrams per liter; μg/l = micrograms per liter

<sup>&</sup>lt;sup>2</sup> The total trihalomethane concentration cannot exceed 80 µg/l.

#### PRELIMINARY CAPTURE ZONE ANALYSIS

#### **GENERAL**

The approximate shape of the predicted capture zone for a production well installed at the Golf Course Site was simulated using an analytical model introduced by Bear (1979). Hydraulic parameters, such as aquifer characteristics, hydraulic gradient, and well discharge rate were input to the model as a basis for estimating the width and downgradient terminus (termed the *stagnation point* in flow net analysis) of the simulated capture zone.

Please note that this analytical model has the following limitations:

- The model is sensitive with respect to hydraulic conductivity and well discharge rate. The
  hydraulic conductivity input, as explained below, was estimated based on grain-size distribution
  and likely is reliable to about an order of magnitude.
- The model has no time component. The model is steady-state, and therefore does not incorporate a time component that could be used to calculate the 1-, 5-, and 10-year times-of-travel to the proposed well. The model also is based on the assumption that the well pumps continuously, 24 hours per day.
- The model does not incorporate boundary conditions, such as the adjacent lakes (positive head boundary) and bedrock (negative head boundary), which could significantly affect capture zone shape and location.

Based on these considerations, we suggest that this analysis be 1) used to develop preliminary conclusions regarding whether the proposed well's capture zone could extend to the reported dump site and 2) refined after site-specific hydraulic testing data is available during Phase 2 of the investigation.

#### **MODEL INPUTS**

The following assumptions were incorporated into the analytical model:

- A pumping rate of 500 gallons per minute (gpm) for the new well.
- A hydraulic gradient equal to 4 x 10<sup>-5</sup> ft/ft, based on measured groundwater elevations during the December 15, 2009 groundwater monitoring event.
- An aquifer hydraulic conductivity of 55 feet per day (ft/d), based on analysis of the grain-size distribution data provided in Appendix C.
- An aquifer thickness of 90 feet, based on subsurface conditions encountered in boring MW-1.

#### MODEL RESULTS

Based on these assumptions and largely as a result of the aquifer's extremely shallow hydraulic gradient, we estimate that the steady-state capture zone of the proposed new well could extend more than 800 feet down-gradient and include the suspected dump site. The validity of this result should be re-evaluated after site-specific hydraulic testing data is available.

#### **CONCLUSIONS AND RECOMMENDATIONS**

#### POTENTIAL FOR HIGH-YIELD WELL

The potential for the Golf Course Site to sustain a high-yield groundwater production well was evaluated using a simplified analytical model based on the Theis (1935) non-equilibrium well equation for confined aquifers and modified using the Jacob correction for unconfined aquifers (Cooper and Jacob, 1946). Model inputs were based on interpreted aquifer hydraulic parameters and geometry and included the following assumptions:

- An aquifer hydraulic conductivity of 55 feet per day (ft/d), based on analysis of the grain-size distribution data provided in Appendix C.
- An aquifer thickness of 90 feet, based on subsurface conditions encountered in boring MW-1.
- An aquifer storativity of 0.2 (which is a dimensionless parameter), based on typical values for unconfined sand and gravel aquifers.
- The aquifer was assumed to be unconfined, homogeneous, isotropic, of infinite areal extent, and without boundary conditions.

Based on these assumptions, modeling results indicate that the Well 2 property can support a high-yield groundwater production well. Our model suggests that in excess of 400 gallons per minute can be withdrawn from this location with acceptable drawdown conditions, assuming a properly designed and efficient well is installed, and aquifer conditions surrounding the new well site are consistent with that observed at the location of monitoring well MW-1.

#### POTENTIAL SOURCES OF CONTAMINATION

Our environmental assessment has revealed the following potential sources of contamination within approximately 1,000 feet of the proposed well site:

- Although no release has been identified, the existing golf course maintenance shop and two ASTs located southwest of the proposed well site present a potential source of contamination. However, because of the good housekeeping practices observed on-site and the fact that releases from these sources (if any) would likely impact only surface soils, the risk for migratory contamination from this source is low at this time, in our opinion.
- Although no release has been identified, we consider the possible presence of an UST located at
  the golf course maintenance shop as a potential source of contamination. Leaks or other releases
  from UST systems are common sources of soil and groundwater contamination. Few details
  regarding this UST have been identified and no reports regarding UST removal or excavation
  sampling activities are available.
- As noted above, we recorded accounts of a former burn site approximately 800 feet east of the proposed well site in the 1950s and early 1960s. While multiple sources state that the site use was limited to a burn site for household yard waste, with the available information we can not eliminate the possibility that automotive parts and/or chemicals could also have been dumped at this location at some time in the past. Former burn area has since been covered and the horizontal extent of this area can not be determined at this time. The burn site was not listed nor was the location disclosed in any of the regulatory databases reviewed.

#### **GROUNDWATER QUALITY**

We conclude that groundwater quality at the location of monitoring well MW-1 generally is good, based on the full suite of sampling results previously described. In our opinion, the observed IOC, VOC, SVOC and radionuclide concentrations are acceptable for siting a new groundwater production well.

Arsenic and nitrate are two specific COCs that are relatively widespread within the glaciofluvial aquifer in the vicinity of Rock Island. Levels of these COCs in other City wells have contributed to the need for an additional water source. As described below, concentrations of these COCs in groundwater samples collected from MW-1 comply with drinking water standards, but likely are elevated with respect to background conditions.

- Arsenic concentrations exceed drinking water standards at a number of locations throughout the
  glaciofluvial aquifer, and are presumably related to historic use of lead arsenate pesticides in
  nearby orchards. The dissolved arsenic concentration in the groundwater sample collected from
  MW-1 (5.51 μg/l) is about 55 percent of the drinking water standard (10 μg/l).
- Nitrate concentrations generally exceed the action level (5 mg/l) in City Well 2 in addition to other portions of the glaciofluvial aquifer, likely as a result of agricultural nonpoint sources and septic tank discharges. The nitrate concentration in the groundwater sample collected from monitoring well MW-1 (3.71 µg/l) is about 75 percent of the action level and 37 percent of the drinking water standard (10 mg/l).

We also note that operation of a high-yield groundwater production well at the Golf Course Site will capture groundwater from a much larger area than our focused groundwater sampling activities, which represent groundwater quality conditions in close proximity to the installed monitoring wells. Therefore, groundwater quality conditions at an installed production well could deviate from those observed during this investigation.

#### POTENTIAL FOR IMPACTS FROM THE REPORTED DUMP SITE

Preliminary analyses indicate that the capture zone associated with the operation of the proposed new well could extend to the reported dump site. However, based on results of groundwater sampling and analysis from monitoring well MW-3, we conclude that the presence of the suspected dump site has not noticeably impacted groundwater quality at that location.

#### RECOMMENDATIONS

Based on the above described data and analyses, it is our opinion that the proposed Golf Course Site is a suitable location for installation and development of a new groundwater production well, with a relatively high potential for high well yield and groundwater quality that appears to be in general compliance with drinking water standards. We believe that the City would be justified in proceeding with a test/production well at the site. However, we recommend that DOH concurrence with the test/production well site be obtained before proceeding.

We recognize that the City might be hesitant to proceed at this time because of 1) arsenic and nitrate concentrations at the Golf Course Site that appear to be somewhat impacted by upgradient land use conditions and 2) regulatory and citizen resistance to the proposed well location. In that case, we recommend that the City consider evaluating groundwater conditions at the Priority 2 groundwater exploration location identified in our December 5, 2007 letter to the City before proceeding at the Golf Course Site. The Priority 2 location is situated within the south central portion of the City adjacent to the

Columbia River. Recommended investigation components at this location include an environmental review, installation of one groundwater monitoring well, groundwater sampling and analytical testing, and limited hydrogeologic analyses.

#### **LIMITATIONS**

We prepared this report for use by the City of Rock Island and Varela to assist in the evaluation of the city's groundwater supply augmentation alternatives.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of hydrogeology in this area at the time this report was prepared. No warranty or other conditions, expressed or implied, should be understood.

Please refer to Appendix E, Report Limitations and Guidelines for Use for additional information pertaining to use of this report.

#### **REFERENCES**

Bear, Jacob, 1979. Hydraulics of Groundwater. Dover Publications, 569 p.

- Cooper, H.H., and Jacob, C.E., 1946, A generalized graphical method for evaluating formation constants and summarizing well field history. Trans. Amer. Geophys. Union., v. 27, p. 526-534.
- Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage. Trans. Amer. Geophys. Union, Vol. 16, pp. 519-524.
- Washington State University College of Engineering Research Division, 1982, Pre & Post Water Quality Investigation for Rock Island, Washington.

### Table 3 Geologic Unit Descriptions Hydrogeologic Evaluation - Golf Course Well Site

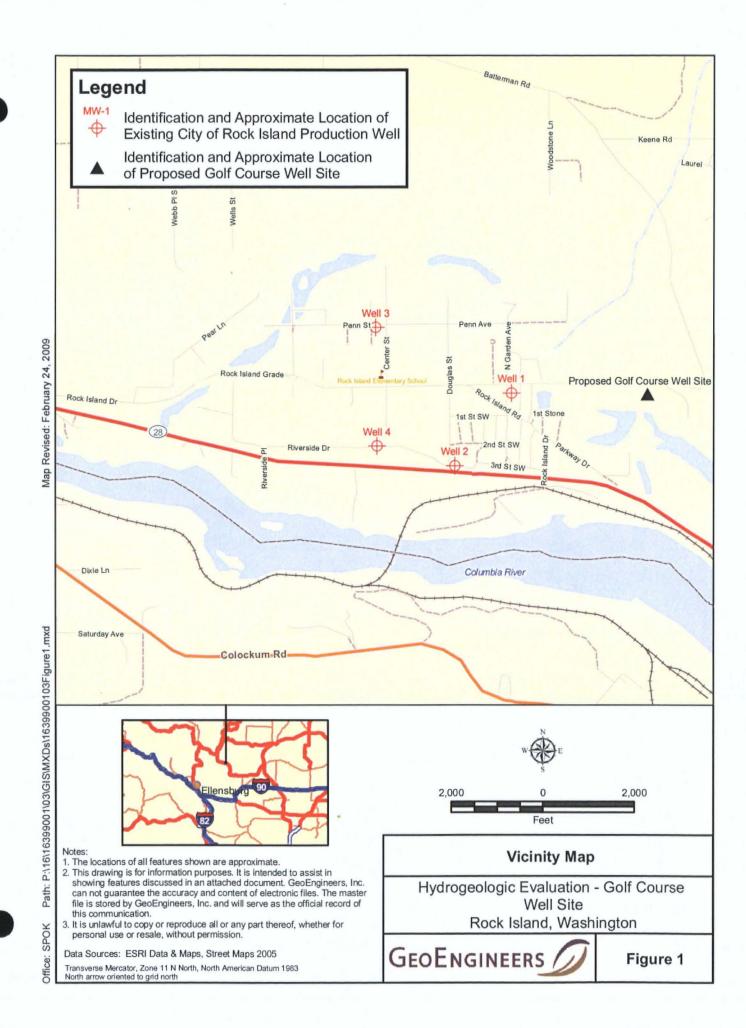
Rock Island, Washington

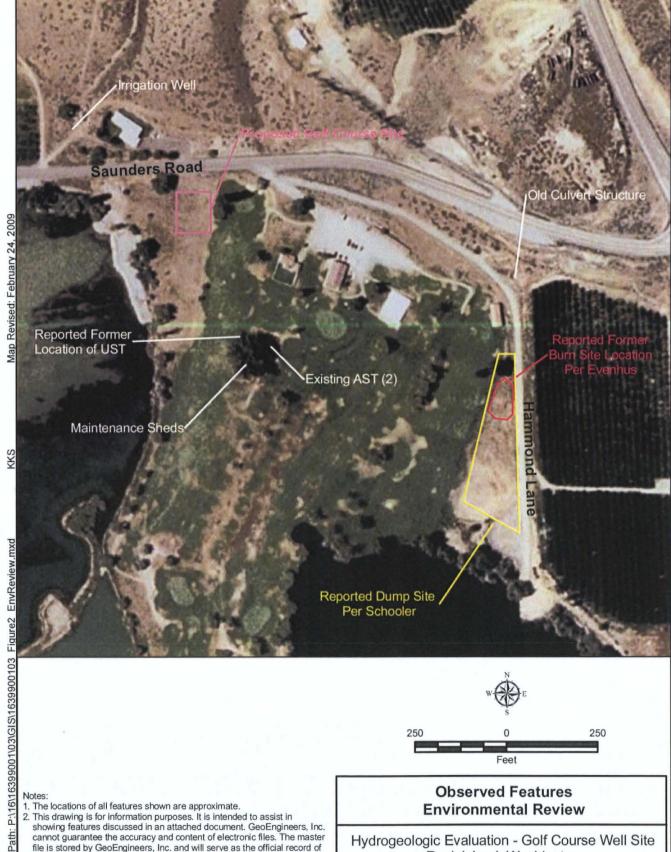
Unit Symbol	Age	Description
Qf	Holocene	Artificial fill, including modified land
Qaf	Holocene	Alluvial fan deposits
Qa	Holocene	Alluvium
Qt	Pleistocene	Terraced deposits
Qls	Pleistocene	Mass-wasting deposits, mostly landslides
Qfs	Pleistocene	Outburst flood deposits, sand and silt
Qfg	Pleistocene	Outburst flood deposits, gravel
Mc(e)	Miocene, middle to upper	Continental sedimentary deposits or rocks
Mvg	Miocene, middle	Basalt flows, Grande Ronde Basalt Formation
Oc(w)	Oligocene	Continental sedimentary deposits or rocks

Note:

These descriptions refer to the geologic units presented in Figure 2.

P:\16\16399001\03\Finals\[1639900103 Table3.xls]UnitKey





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- Notes:

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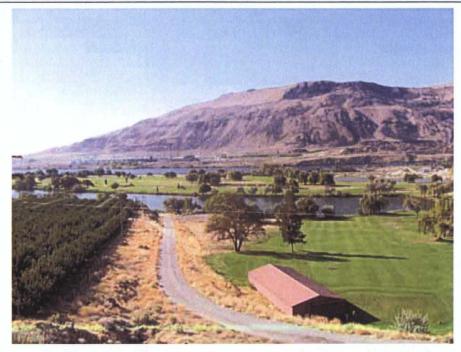
Data Sources: ESRI I3 Imagery (NAIP 2006), Douglas County roads 2006 Transverse Mercator, Zone 10 N North, North American Datum 1983 North arrow oriented to grid north

#### **Observed Features Environmental Review**

Hydrogeologic Evaluation - Golf Course Well Site Rock Island, Washington







Looking south from adjacent road toward former burn site reportedly located between tree in center of photo and gravel turn-around visible near water

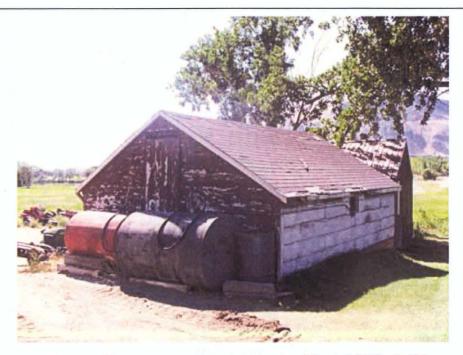


Looking west toward golf course clubhouse former burn site reportedly located in photo foreground

Site Photographs – September 2008

Hydrogeologic Evaluation – Gold Course Well Site Rock Island, Washington





Looking south at golf course maintenance shed fuel ASTS visible; reported UST formerly located along white wall of shed

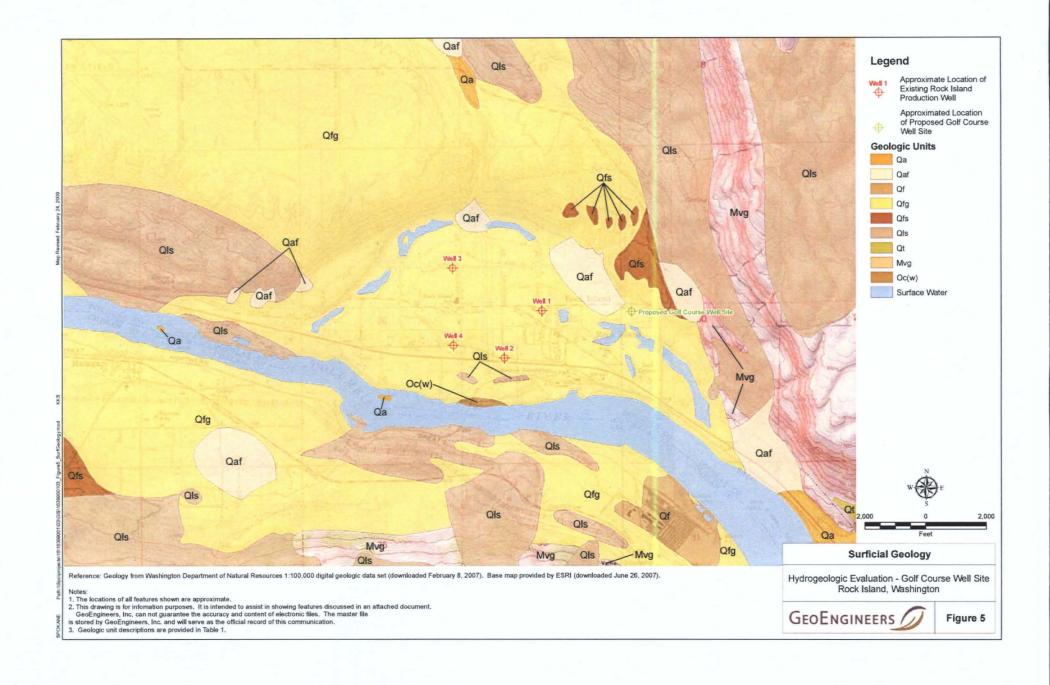


Looking north toward proposed well site in middle distance west end of golf course

Site Photographs - September 2008

Hydrogeologic Evaluation – Gold Course Well Site Rock Island, Washington



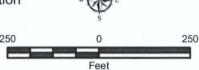




MW-2



Monitoring Well Identification and Approximate Location



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#### **Monitoring Well Locations**

Hydrogeologic Evaluation - Golf Course Well Site Rock Island, Washington



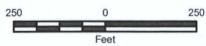




MW-1 Monitoring Well Number, Approximate Location, 617.05 and Groundwater Elevation on December 15, 2008



Approximate Groundwater Flow Direction



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#### **Groundwater Elevations December 15, 2008**

Hydrogeologic Evaluation - Golf Course Well Site Rock Island, Washington





APPENDIX A
ENVIRONMENTAL DATA RESOURCES, INC. REPORT

Rock Island Golf Course 314 Saunders Road Rock Island, WA 98802

Inquiry Number: 2309645.2s

September 04, 2008

## The EDR Radius Map™ Report with GeoCheck®



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# APPENDIX B HISTORICAL AERIAL PHOTOS



### **Rock Island Golf Course**

314 Saunders Road Rock Island, WA 98802

Inquiry Number: 2309645.5

September 05, 2008

## The EDR Aerial Photo Decade Package



## **EDR Aerial Photo Decade Package**

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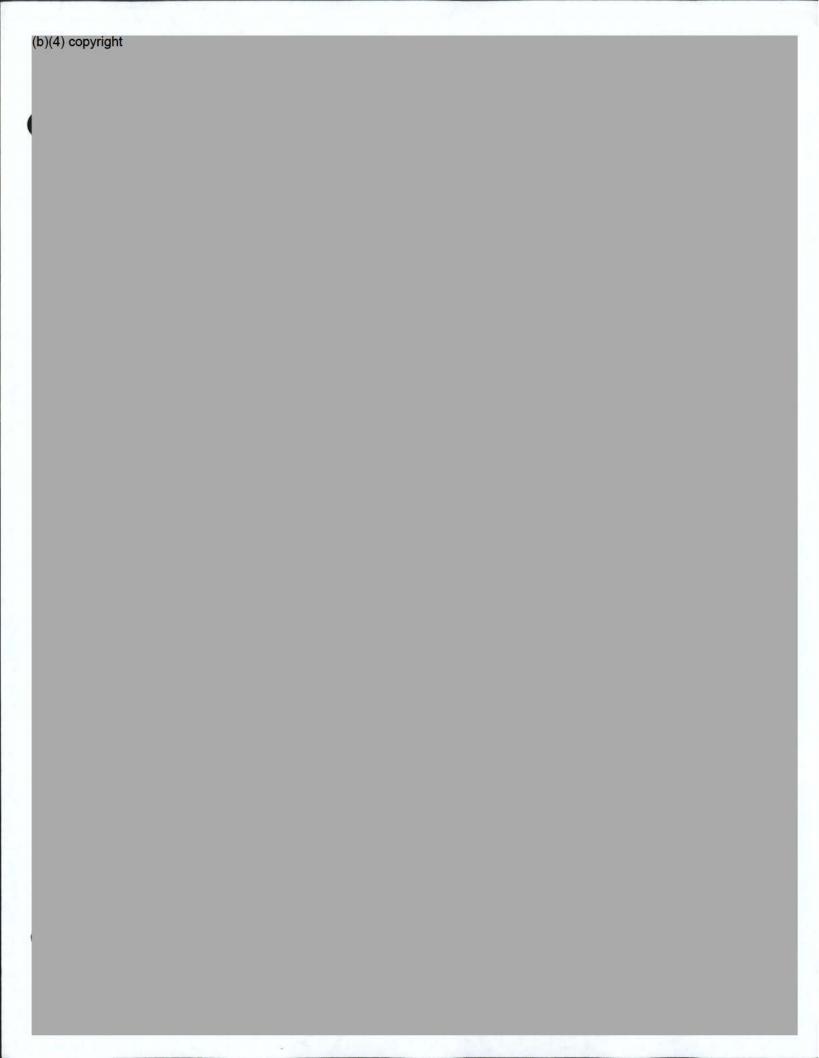
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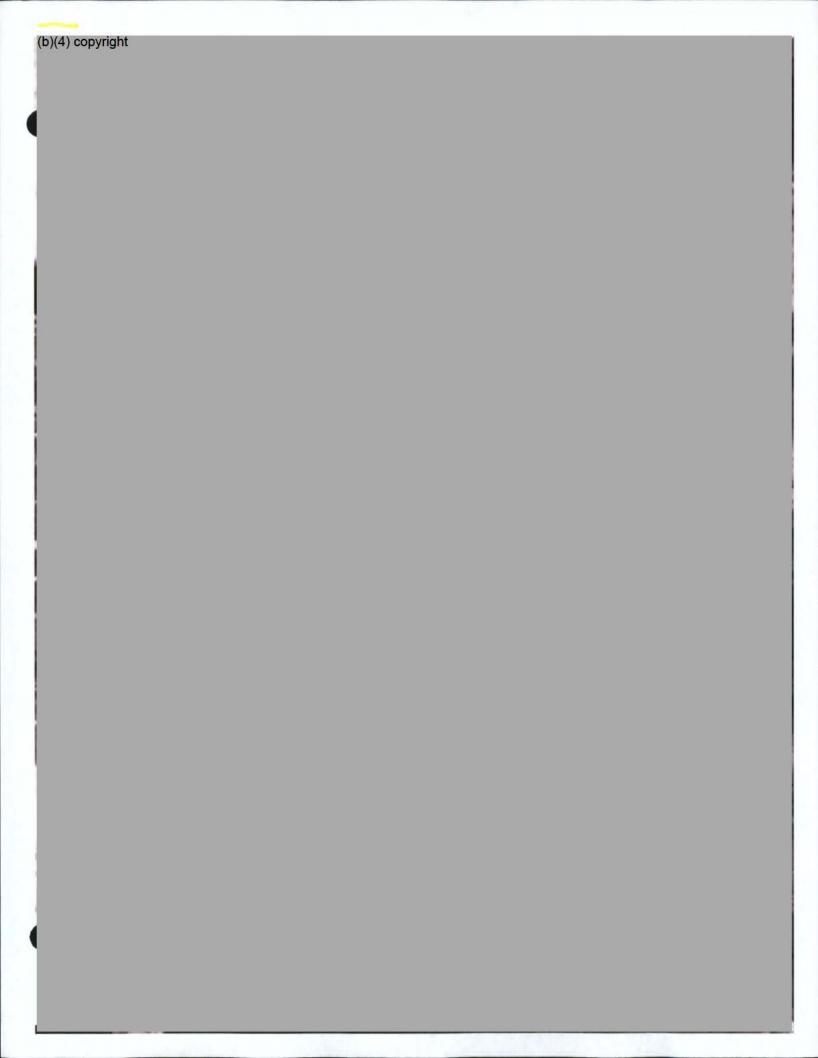
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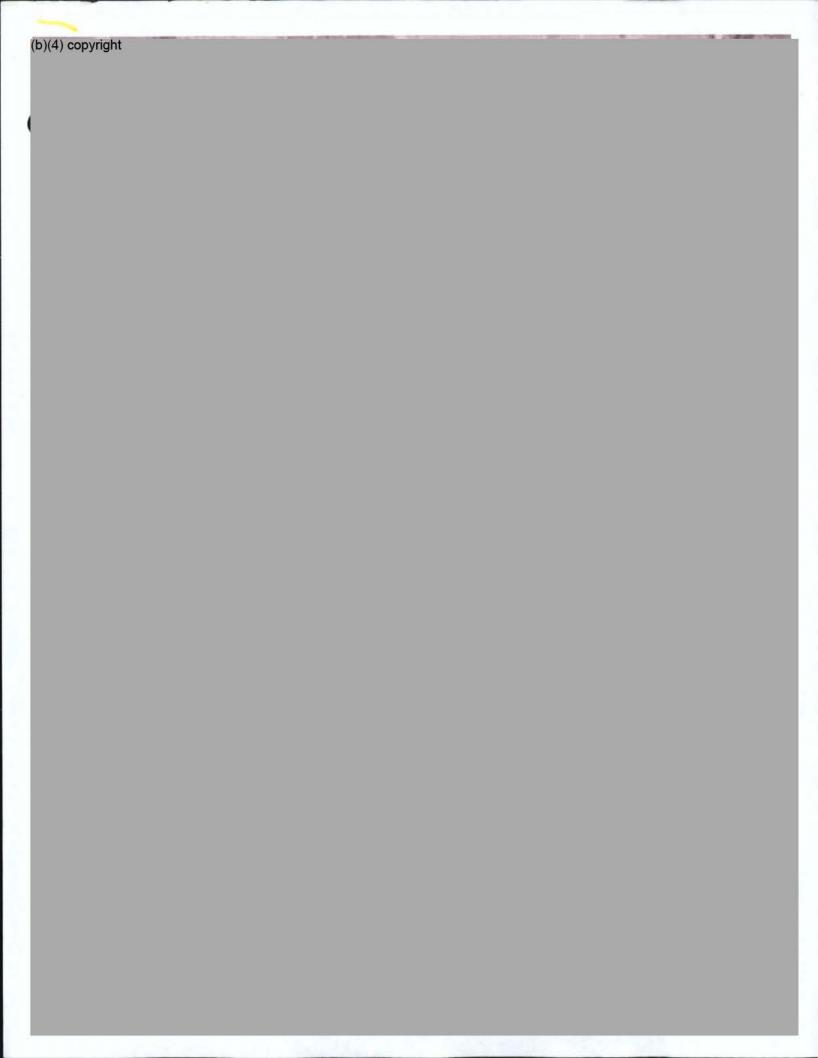
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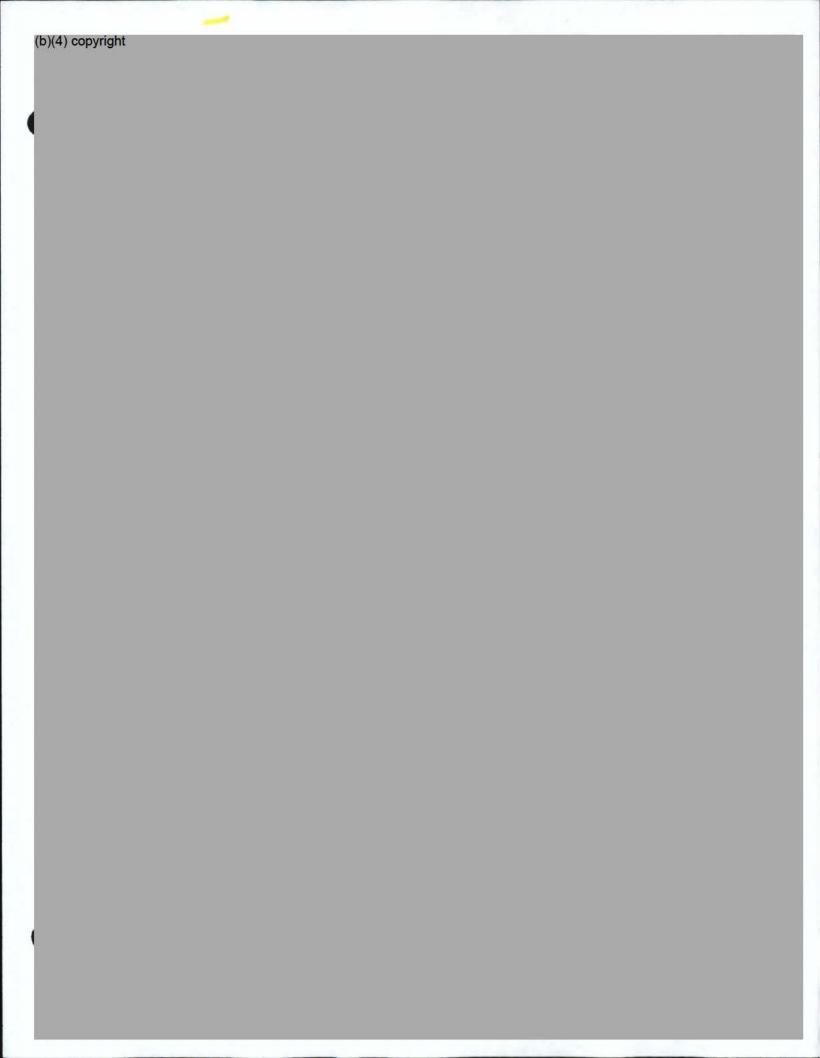
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## APPENDIX C FIELD AND LABORATORY PROCEDURES

## APPENDIX C FIELD AND LABORATORY PROCEDURES

#### SITE EXPLORATION

Three monitoring wells, MW-1 through MW-3, were completed by Gregory on December 2 through 10, 2008 at the approximate locations shown on Figure 6 using a combination of hollow-stem auger and mud rotary drilling methods. Drilling and well installation activities were continuously monitored by a geologist from our firm who collected, examined, and classified representative soil samples and maintained a detailed log of the explorations. During drilling, soil samples were obtained at an approximate 5-foot-depth interval using an approximate 2-inch-diameter split spoon sampler driven by a 140-pound hammer free falling a distance of about 30 inches. The number of hammer strokes required to drive the sampler the last 12 inches, or other indicated distance, is shown on the boring logs.

Soil was classified in general accordance with the Unified Soil Classification System described in Figure C-1. The boring and well construction logs for monitoring wells MW-1 through MW-3 are presented in Figures C-2 through C-4, respectively.

#### FIELD SCREENING METHODS

Our representative conducted field screening on each of the soil samples obtained from the borings. Field screening results are used as a general guideline to identify possible soil contamination. The field screening methods employed included a combination of 1) visual examination; 2) water sheen testing; and 3) headspace vapor testing using a PID.

Visual screening consists of inspecting the soil for stains indicative of contamination. Visual screening is generally more effective when contamination is caused by heavy petroleum hydrocarbons such as motor oil, or when contaminant concentrations are high. Water sheen tests and headspace vapor screening are more sensitive screening methods which can be effective in detecting petroleum based-products in concentrations lower than regulatory cleanup guidelines. However, field-screening results are site- and sample-specific. The effectiveness of field screening results will vary with temperature, moisture content, soil lithology, organic content and type of contaminant. The presence or absence of sheen or headspace vapors does not necessarily indicate the presence or absence of contaminants.

Water sheen testing involves placing soil in water and observing the water surface for signs of sheen. The results of water sheen testing on soil samples from the borings are presented on the boring logs. Sheens are classified as follows:

No Sheen (NS)	No visible sheen on water surface.
---------------	------------------------------------

Slight Sheen (SS) Light colorless film, spotty to globular; spread is irregular, not rapid;

areas of no sheen remain; film dissipates rapidly.

Moderate Sheen (MS) Light to heavy film, may have some color or iridescence, globular to

stringy, spread is irregular to flowing; few remaining areas of no sheen

on water surface.

Heavy Sheen (HS) Heavy colorful film with iridescence; stringy, spread is rapid; sheen

flows off the sample; most of water surface may be covered with sheen.

Headspace vapor screening involves placing a soil sample in a plastic bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The probe of the PID is inserted into the bag and the PID measures the concentration of organic vapors in the sample bag headspace.

#### MONITORING WELL CONSTRUCTION AND DEVELOPMENT

Monitoring wells MW-1 through MW-3 were constructed using approximate 2-inch-diameter Schedule 40 PVC riser and well screen material. Well screen slot size was about 0.010 inches. Processed 10-20 Colorado silica sand was used as filter pack. Bentonite grout was used as low-permeability backfill. At the ground surface, the wells were protected by steel flush-mount monuments. The tops of the monitoring well casings were secured with expanding, lockable well caps.

After installation, monitoring wells were developed by a combination of flushing, pumping and surging until purge water was relatively clear and free of suspended sediment, or until a maximum development time of 2 hours.

#### **GROUNDWATER ELEVATIONS**

Depth to groundwater was measured relative to the monitoring well casing rims using an electric water level meter. The probe of the water level meter was decontaminated between wells with a detergent wash, a tap water rinse, and a distilled water rinse. Groundwater table elevations were calculated by subtracting the depth to the water table from the casing rim elevations.

#### **GROUNDWATER SAMPLING**

Groundwater samples were obtained from monitoring wells MW-1 and MW-3 for chemical analysis. Groundwater purging and sampling was performed consistent with the EPA's low-flow groundwater sampling procedure, as described in EPA (1996) and Puls and Barcelona (1996). Dedicated polyethylene tubing and a portable bladder pump were used for groundwater purging and sampling. During purging activities, water quality parameters, including pH, temperature, conductivity, dissolved oxygen, and turbidity were measured using a Horiba U-22XD-10 multi-parameter meter equipped with a flow-through cell. The meter was calibrated prior to use following manufacturer procedures. Groundwater samples were collected after (1) water quality parameters were stabilized or (2) a maximum purge time of one hour was achieved. During purging and sampling, drawdown was not allowed to exceed 0.3 feet and the purge rate was not allowed to exceed 400 milliliters per minute. Water quality parameter stabilization criteria include the following:

- Turbidity: ±10 percent for values greater than 5 NTU;
- Conductivity: ±3 percent;
- pH: ±0.1 unit;
- Temperature: ±3 percent; and
- Dissolved oxygen: ± 10 percent.

The samples were transferred in the field from the sampling device to laboratory-prepared containers. Samples were placed into a chilled cooler and transported to the analytical laboratory following completion of sampling. Chain-of-custody procedures were observed and groundwater samples were kept cool during transport to the laboratory.

#### **LABORATORY TESTING**

Soil samples obtained from the explorations were returned to our laboratory for further examination and testing. Gradation tests (ASTM C136) were accomplished on representative soil samples. Results of ASTM C136 analyses are presented in Appendix C.

Selected samples were tested to estimate their natural moisture content in general accordance with ASTM D2216-90. Results are presented on the exploration logs at the respective sample depths.

#### SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		SYMBOLS		TYPICAL	
		GRAPH	LETTER	DESCRIPTIONS	
	GRAVEL	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	AND GRAVELLY SOILS	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
COARSE GRAINED MORE THAN 50%		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
SOILS OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND- CLAY MIXTURES	
SAND		CLEAN SANDS		sw	WELL-GRADED SANDS, GRAVELLY SANDS
MORE THAN 50% RETAINED ON NO. 200 SIEVE	AND SANDY SOILS	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND
MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES	
	(APPRECIABLE AMOUNT OF FINES)		sc	CLAYEY SANDS, SAND - CLAY MIXTURES	
				ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE GRAINED	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS LEAN CLAYS
SOILS				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200	7			МН	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
SIEVE SILTS AND CLAYS		LIQUID LIMIT GREATER THAN 50		СН	INORGANIC CLAYS OF HIGH PLASTICITY
			July July	ОН	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
н	GHLY ORGANIC	SOILS	346	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

#### ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL
GRAPH	RAPH LETTER DESCRIPTIONS	
	СС	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

 $\bar{\Lambda}$ 

Measured groundwater level in exploration, well, or piezometer



Groundwater observed at time of exploration



Perched water observed at time of exploration



Measured free product in well or piezometer

#### Stratigraphic Contact

Distinct contact between soil strata or geologic units



Gradual change between soil strata or geologic units

\_ A

Approximate location of soil strata change within a geologic soil unit

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

#### Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight

A "P" indicates sampler pushed using the weight of the drill rig.

#### Laboratory / Field Tests

Percent fines Atterberg limits Chemical analysis AL CA CP CS DS Laboratory compaction test Consolidation test Direct shear HA Hydrometer analysis MC Moisture content Moisture content and dry density MD OC PM PP Organic content Permeability or hydraulic conductivity Pocket penetrometer SA Sieve analysis TX Triaxial compression UC Unconfined compression Vane shear

#### Sheen Classification

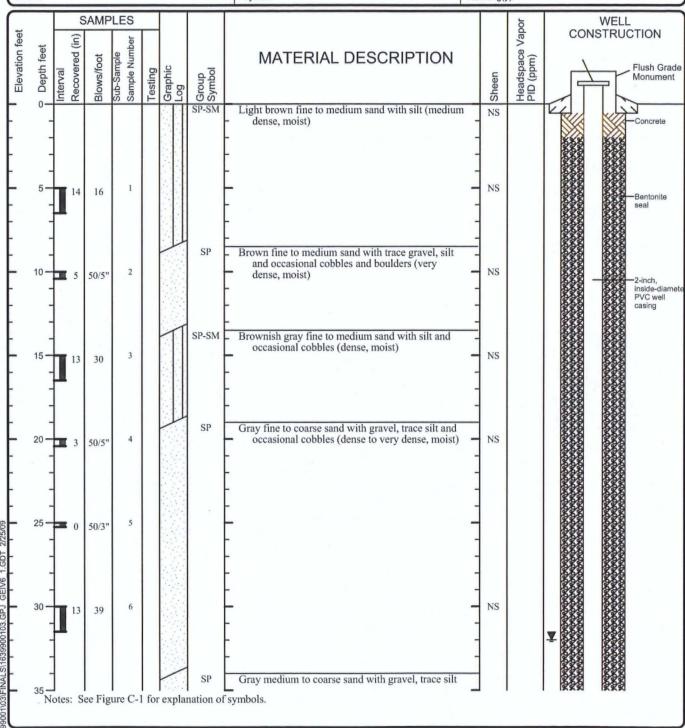
NS No Visible Sheen SS Slight Sheen MS Moderate Sheen HS Heavy Sheen NT Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

## **KEY TO EXPLORATION LOGS**



Date(s) Drilled	12/02/08 - 12/03/08	Logged By	LMS	Checked By	DRL
Drilling Contractor	Gregory Drilling	Drilling Method	Hollow-Stem Auger/Mud Rotary with Casing Advance	Sampling Methods	SPT
Auger Data	4½-inch ID Auger/4½-inch ID Casing	Hammer Data	140 lb hammer/30 in drop	Drilling Equipment	CME 85
Total Explora Depth (ft)	ation 101	Ground St Elevation	Not measured	Groundwater Level (ft. bgs)	32
Vertical Datum		Datum/ System		Easting(x): Northing(y):	



#### **LOG OF MONITORING WELL MW-1**

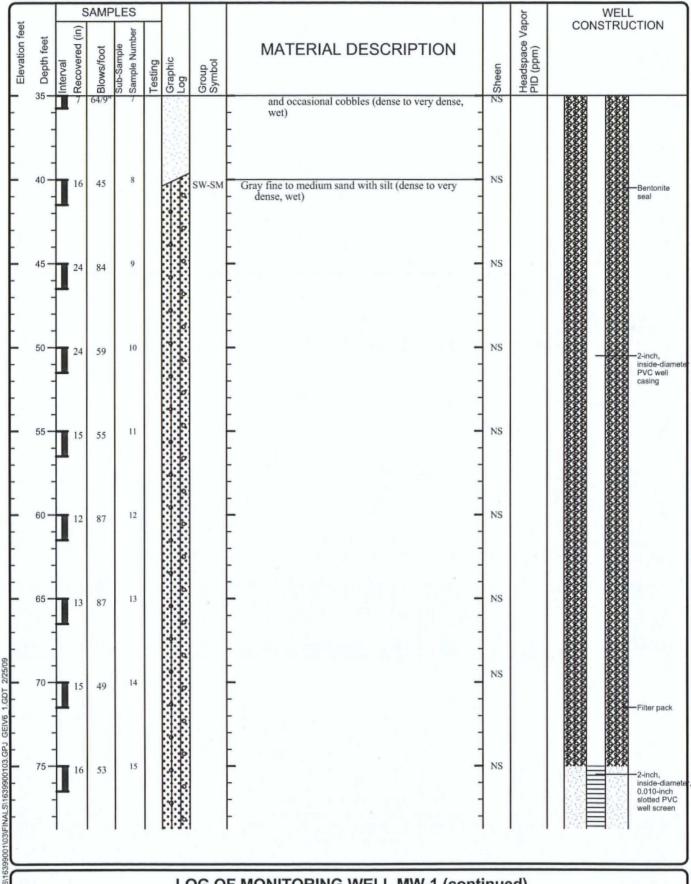


Project: Hydrogeologic Evaluation - Golf Course Well Site

Project Location: Rock Island, Washington

Project Number: 16399-001-03

Figure: C- 2 Sheet 1 of 3



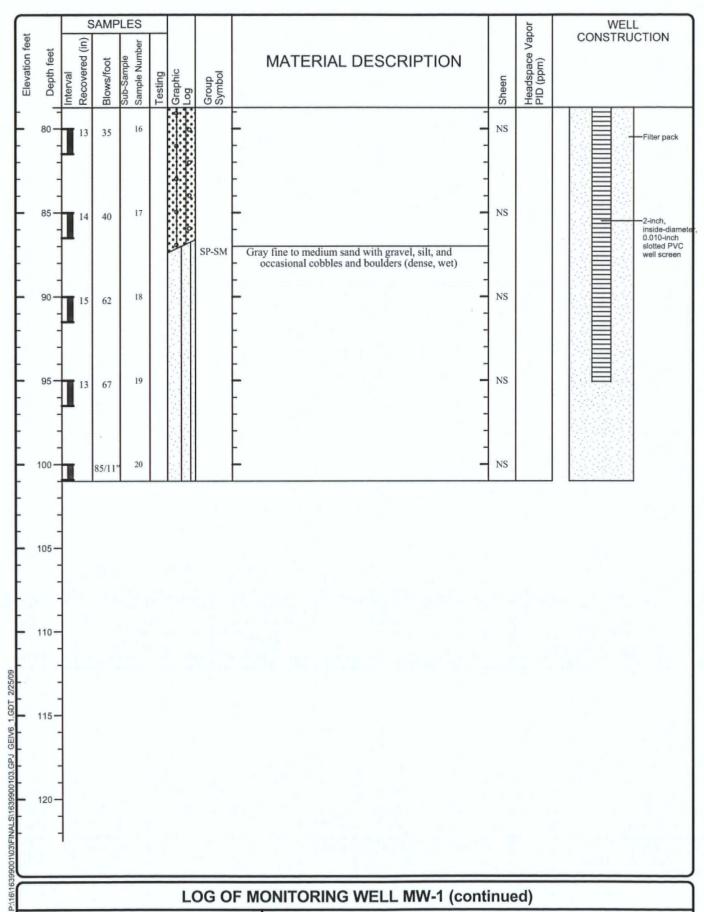
### LOG OF MONITORING WELL MW-1 (continued)



Project: Hydrogeologic Evaluation - Golf Course Well Site

Project Location: Rock Island, Washington

Project Number: 16399-001-03 Figure: C- 2 Sheet 2 of 3





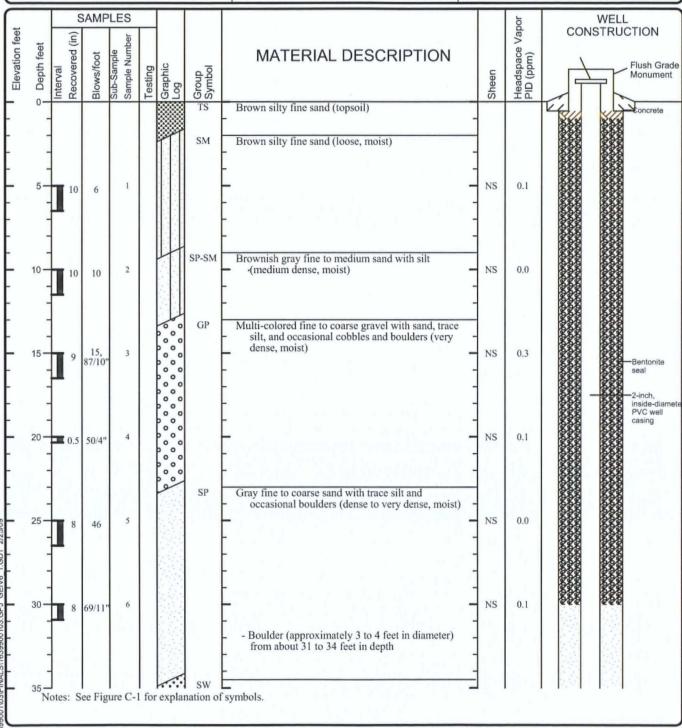
Project: Hydrogeologic Evaluation - Golf Course Well Site

Project Location: Rock Island, Washington

Project Number: 16399-001-03

Figure: C- 2 Sheet 3 of 3

Date(s) Drilled	12/04/08 - 12/05/08	Logged By	LMS	Checked By	DRL
Drilling Contractor	Gregory Drilling	Drilling Method	Mud Rotary with Casing Advance	Sampling Methods	SPT
Auger Data	4½-inch ID Casing	Hammer Data	140 lb hammer/30 in drop	Drilling Equipment	CME 85
Total Exploration Depth (ft)	75.5	Ground Surface Elevation (ft)	Not measured	Groundwater Level (ft. bgs)	38
Vertical Datum		Datum/ System		Easting(x): Northing(y):	



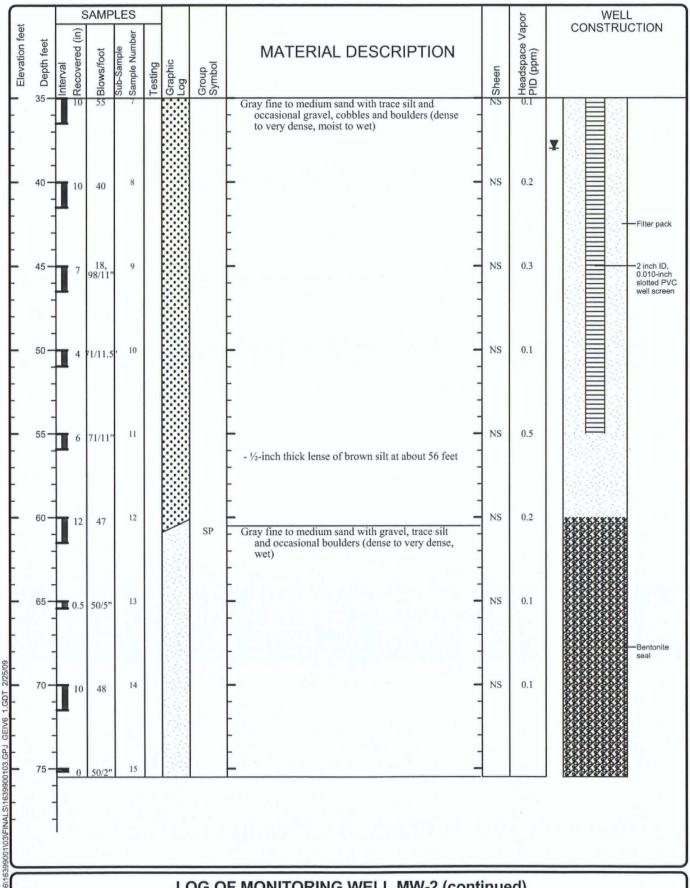
#### **LOG OF MONITORING WELL MW-2**



Project: Hydrogeologic Evaluation - Golf Course Well Site

Project Location: Rock Island, Washington

Project Number: 16399-001-03 Figure: C- 3
Sheet 1 of 2



### LOG OF MONITORING WELL MW-2 (continued)

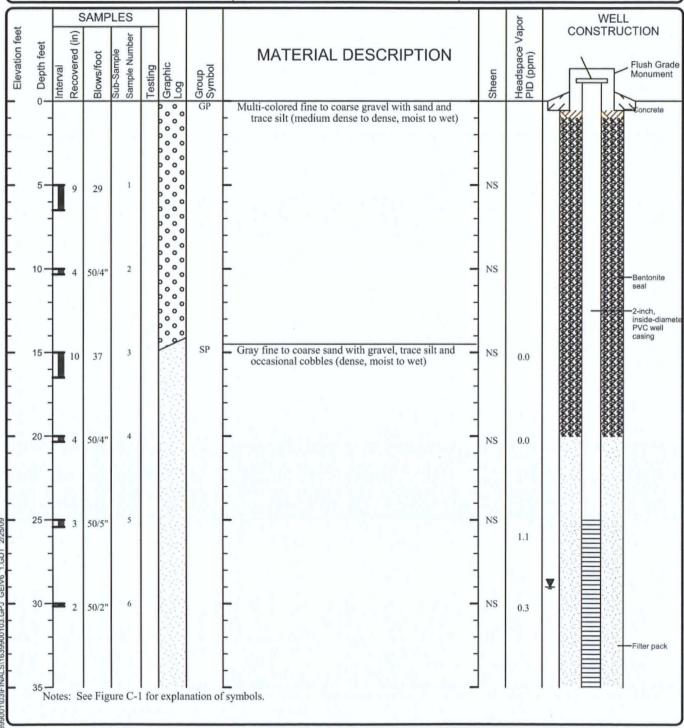


Project: Hydrogeologic Evaluation - Golf Course Well Site

Project Location: Rock Island, Washington

Figure: C-3 Project Number: 16399-001-03 Sheet 2 of 2

Date(s) Drilled	12/06/08	Logged By	KC	Checked By	DRL
Drilling Contractor	Gregory Drilling	Drilling Method	Hollow-Stem Auger/Hq Rock Core	Sampling Methods	SPT
Auger Data	4½-inch ID Auger	Hammer Data	140 lb hammer/30 in drop	Drilling Equipment	CME 85
Total Exploration Depth (ft)	75	Ground Surf Elevation (ft	Not measured	Groundwater Level (ft. bgs)	29
Vertical Datum		Datum/ System		Easting(x): Northing(y):	



### LOG OF MONITORING WELL MW-3

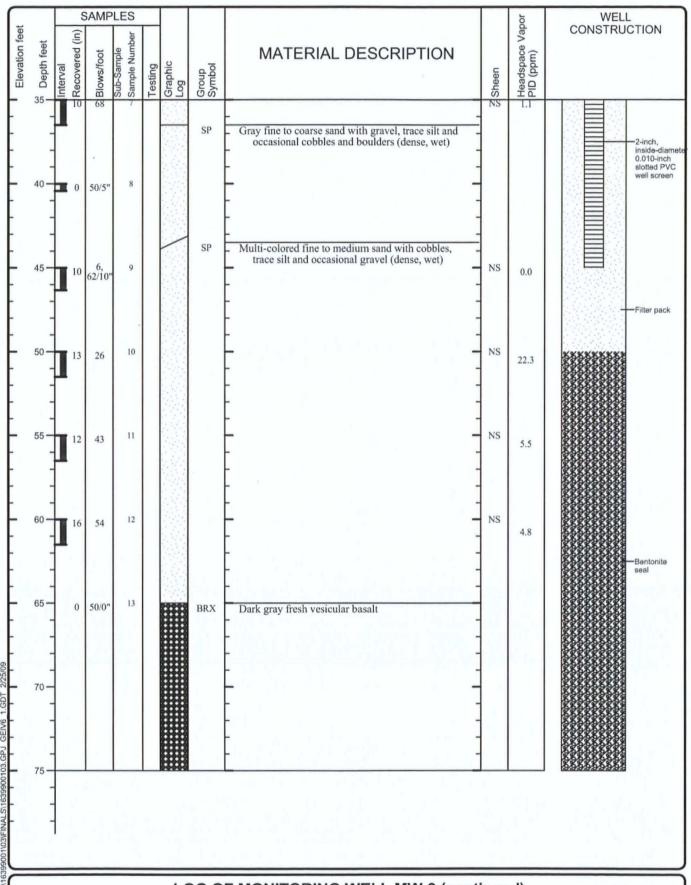


Project: Hydrogeologic Evaluation - Golf Course Well Site

Project Location: Rock Island, Washington

Project Number: 16399-001-03

Figure: C- 4 Sheet 1 of 2



### LOG OF MONITORING WELL MW-3 (continued)

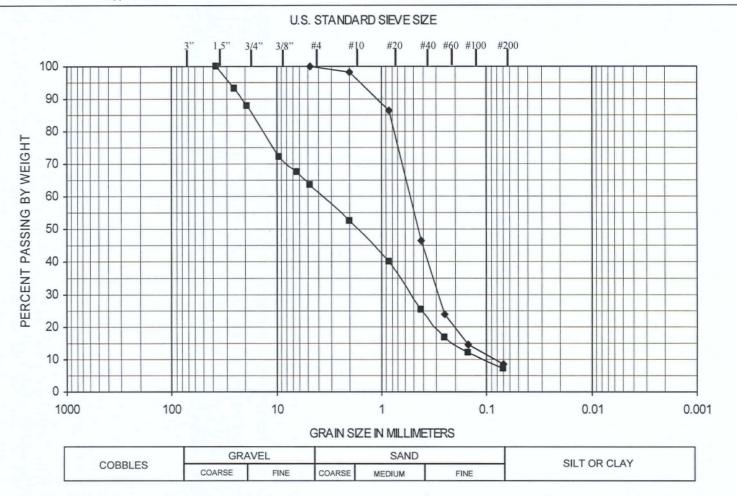


Project: Hydrogeologic Evaluation - Golf Course Well Site

Project Location: Rock Island, Washington

Project Number: 16399-001-03

Figure: C- 4 Sheet 2 of 2



SYMBOL	EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	SOIL CLASSIFICATION
•	MVV-1	70	Fine to medium sand with silt
	MVV-1	90	Fine to medium sand with gravel and silt

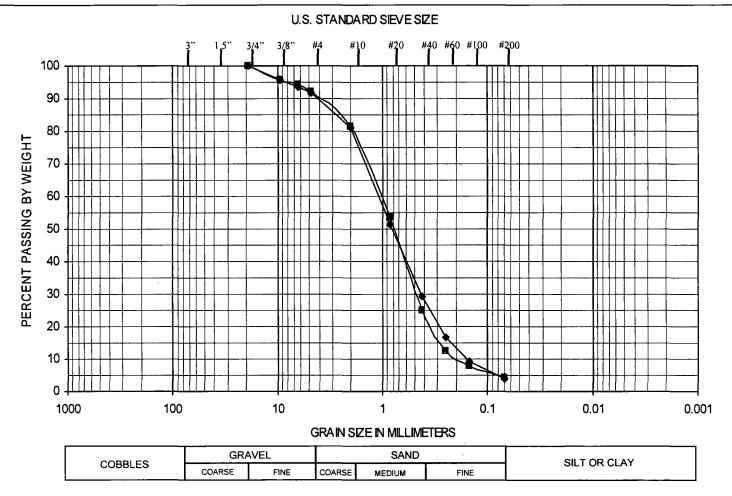
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## Sieve Analysis Results

Hydrogeologic Evaluation – Golf Course Well Site Rock Island, Washington



Figure C-5



SYMBOL	EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	SOIL CLASSIFICATION
<b>*</b>	MVV-2 MVV-3	40 50	Fine to medium sand with trace silt and occasional gravel Fine to medium sand with trace silt and occasional gravel

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#### Sieve Analysis Results

Hydrogeologic Evaluation – Golf Course Well Site Rock Island, Washington



Figure C-6



# APPENDIX D CHEMICAL ANALYTICAL REPORTS

## APPENDIX D CHEMICAL ANALYTICAL REPORTS

#### **SAMPLES**

Chain-of-custody procedures were followed during transport of field samples to the selected accredited analytical laboratory. The samples were held in cold storage pending extraction and/or analysis. The analytical results are included in this appendix.

#### **ANALYTICAL DATA REVIEW**

The selected laboratories maintains an internal quality assurance/quality control program as documented in its laboratory quality assurance manual. The laboratories use a combination of blanks, surrogate recoveries, duplicates, matrix spike recoveries, matrix spike duplicate recoveries, blank spike recoveries and blank spike duplicate recoveries to evaluate the analytical results. The laboratories also uses data quality goals for individual chemicals or groups of chemicals based on the long-term performance of the test methods. The data quality goals were included in the laboratory reports. The laboratories compared each group of samples with the existing data quality goals and noted any exceptions in the laboratory reports.

No exceptions were noted in the laboratory reports. Based on our data quality review, it is our opinion that these analytical data are of acceptable quality for their intended use.



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### INORGANIC CONTAMINANTS (IOC) ANALYTICAL REPORT

Send Report to:  Geo Engineers. Inc.  Jon Rudders  523 E 2nd Ave.  Spakane, WA 99202	Bill to: (Client Name)  Geo Engineers, Inc  Jon Rudders  523 E 2nd Ave  Spokane, WA 99202
Date Collected: (MM/DD/YY)       12       /15       /98         Water System ID Number	System Group Type: (Circle one) A B Other: (Specify)  System Name: City of Rock Island  County: Douglas  Source Numbers(s),,,,
Sample Purpose: (Check Appropriate Box)  RC - Routine/Compliance (satisfies monitoring requirements)  C - Confirmation (confirmation of chemical result)  I - Investigative (does not satisfy monitoring requirements)  O - Other (specify)	Date Received: (MM/DD/YY) 12 / 15 / 98  Applyzed Date Reported: (MM/DD/YY) 12 / 29 / 98  Reported Date Received: (MM/DD/YY) 12 / 29 / 98  COMMENTS:
Sample Composition: (Check Appropriate Box)  X S - Single Source B - Blended (List Multiple Source Numbers in Source Nos. field) C - Composite (Specify in Comments field) D - Distribution sample	Sample Type: (Check one) Pre-Treatment/Raw Post-Treatment/Finished Unknown  Sample Collected by: Client Phone Number: 785-755-0110

#### **EPA/STATE REGULATED (PRIMARY)**

DOH#	ANALYTE	RESULTS	UNITS	SRL	TRIGGER	MCL	MCL Exceeded	METHOD/Analyst Initials
0004	ARSENIC	0.0078	mg/L	0.003	0.010	0.010	No	SM 3113B/BP
0005	BARIUM	0.067	mg/L	0.4	2	2	No	SN 3120B/RLK
0006	CADMIUM	0.0003	mg/L	0.002	0.005	0.005	No	SN 31138/BP
0007	CHROMIUM	0.0108	mg/L	0.02	0.1	0.1	No	SM 3120B/RLK
0011	MERCURY	< 0.0003	mg/L	0.0004	0.002	0.002	No	EPA245.1/BP
0012	SELENIUM	< 0.005	mg/L	0.01	0.05	0.05	Но	SM 3113B/BP
0110	BERYLLIUM	< 0.0002	mg/L	8000.0	0.004	0.004	No	SM 31208/RLK
0111	NICKEL	< 0.01	mg/L	0.01	0.1	0.1	No	SM 3120B/RLK
0112	ANTIMONY	< 0.005	mg/L	0.006	0.006	0.006	No	SM 3113B/BP
0113	THALLIUM	< 0.001	mg/L	0.002	0.002	0.002	No	EPA 200.9/BP
0116	CYANIDE	< 0.01	mg/L	0.1	0.2	0.2	Нo	EPA335. 2/AB
0019	FLUORIDE	0.54	mg/L	0.5	4	4	No	4500F-C/TWO
0114	NITRITE-N	< 0.07	mg/L	0.2	0.5	1_1	No	4500NO2-F/CTG
0020	NITRATE-N	3,71	mg/L	2	5	10	No	4500NO3-F/CTG
0161	TOTALNITRATE/NITRITE	3.71	mg/L	2	5	10	No	4500NO3-F/CTG

Form #25

Rev. 8/06



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#### INORGANIC CONTAMINANTS (IOC) ANALYTICAL REPORT

Send Report to:  Gen Engineers, Inc  Top Budders  527 E 2nd Ave  Spokana, VA 99202	Bill to: (Client Name)  Gen Engineers, Inc.  Jon Rudders  523 E 2nd Ave.  Spakene, RA 99202
Date Collected: (MM/DD/YY) 12 /15 /14A  Water System ID Number  Lab Sample Number 185-151 824294  Sample Location: P7 HVB1  Sample Purpose: (Check Appropriate Box)  PRC - Routine/Compliance (satisfies monitoring requirements)  C - Confirmation (confirmation of chemical result)  1 - Investigative (does not satisfy monitoring requirements)  O - Other (specify)	System Group Type: (Circle one) A B Other: (Specifyx)  System Name: City of Rock Island  County:
Sample Composition: (Check Appropriate Box)  X S - Single Source B - Blended (List Multiple Source Numbers In Source Nos. field) C - Composite (Specify in Comments field) D - Distribution sample	Sample Type: (Check one) Pre-Treatment/Raw Post-Treatment/Finished Unknown  Sample Collected by: Client Phone Number: 785-766-0110

#### **EPA/STATE REGULATED (PRIMARY)**

DOH#	ANALYTE	RESULTS	UNITS'	SRL	* TRIGGER	MCL	MCL Exceeded	METHOD/Analyst Initials
0004	ARSENIC	0.0078	mg/L	0.003	0.010	0.010	No	SM 31138/BP
0005	BARIUM	0.067	mg/L	0.4	2	2	llo	SM 31208/RLK
0006	CADMIUM	ø. 6903	mg/L	0.002	0.005	0.005	lle	5M 3113B/BP
0007	CHROMIUM	0.6108	mg/L	0.02	0.1	0.1	Ho	SN 3120B/RLK
0011	MERCURY	< 0.0033	mg/L	0.0004	0.002	0.002	No	EFA245, 1/BP
0012	SELENIUM	< 0.605	mg/L	0.01	0.05	0.05	Ro	SM 3113B/BP
0110	BERYLLIUM	< 0.0002	mg/L	0.0008	0.004	0.004	No	SK 3120B/RLK
0111	NICKEL	< 0.01	mg/L	0.01	0.1	0.1	No	3M 3120B/PLE
0112	ANTIMONY	< 0.005	mg/L	0.006	0.006	0.006	No	SK 3113B/BP
0113	THALLIUM	6.001	mg/L	0.002	0.002	0.002	ho	EFA 200. 9/BP
0116	CYANIDE	< 0.01	mg/L	0.1	0.2	0.2	Ro	EFA335. 2-AR
0019	FLUORIDE	Q. 54	mg/L	0.5	4	4	lie	4500F-C/TWO
0114	NITRITE-N	< 0, 67	mg/L	0.2	0.5	1	Ho	4500NU2-F/CTG
0020	NITRATE-N	3, 71	mg/L	2	5	10	No	450@NC3-F/CT6
0161	TOTALNITRATENITRITE	3, 71	mg/L	2	5	10	No	4500NO9-F/CT6

	DOH#	ANALYTE	RESULTS	UNITS	SRL	TRIGGER	MCL	>MCL? Exceeded	METHOD/Analyst Initials
[	0008	IRON	5, 90	mg/L	0.1	0.3	0.3	Yes	SM 31208/RLK
	0010	MANGANESE	0.132	mg/L	0.01	n/a	0.05	Yes	SM 3120B/RLK
	0013	SILVER	< 0.9047	mg/L	0.1	n/a	0.1	No	SM 3120B/RLK
[	0021	CHLORIDE	8, 4	mg/L	20	n/a	250	No	4500C1-B/RHN
	0022	SULFATE	70.0	mg/L	50	n/a	250	No	4500S04E/AB
ſ	0024	ZINC	0,555	mg/L	0.2	5	5	No	SM 3120B/RLK

#### **EPA/STATE UNREGULATED (as source contaminants)**

0014	SODIUM	-100	mg/L	5		n/a	No.	SN 31208/RLK
0015	HARDNESS	120	mg/L	10		n/a	No.	SN 22408/Calculated
0016	CONDUCTIVITY	C1A	mg/L	70	n/a	700	- Ko	EM 25109/80
0017	TURBIDITY	274	mg/L	0.1		п/а	You	SM 2130R/RP
0018	COLOR		mg/L	15	n/a	15	No.	SM 2120P/RIK
0026	TOTAL DISSOLVED SOLIDS (TDS)	200	mg/L	100	n/a	500	11.	CH OSAG CICTO
0009	LEAD	JWO.		0.001	0.015	n/a	no -	501 2540 67615
0023	COPPER	0.0044 0.0776		0.02	1.3	n/a	No	28-31200/RLK

#### **OTHER**

171	ORTHOPHOSPHATE	HA	mg/L	0.01			
172	SILICA	NA	mg/L	1.0			
402	ALUMINUM	NA	mg/L	0.05			
403	ALKALINITY	NA	mg/L	0.1			
404	MAGNESIUM	10.6	mg/L	0.01		No	SM 3120B/RLK
405	CALCIUM	30. 4	mg/L	0.5		No	SM 3120B/RLK
406_	AMMONIA	NA	mg/L	1.0			
	pН	NA		_			
	Total Organic Carbon	NA	mg/L				

105-151

024294

#### NOTES:

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your DOH drinking water regional office for further information.

MCL (maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.

NA: Not Analyzed: In the results column, indicates this compound was not included in the current analysis.

Comments:	1 ung 12	W//W		
	<i>U</i>			
		<del> </del>	_ <del> </del>	
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	DOH#	ANALYTE	RESULTS	<u>UNITS</u>	<u>SRL</u>	TRIGGER	MCL	<u>&gt;MCL?</u> Exceeded	METHOD/Analyst Initials
	0008	IRON	5 qp	mg/L	0.1	0.3	0.3	<u>V</u> ag	SR 21264/PIR
	0010	MANGANESE	ja 197	mg/L	0.01	n/a	0.05	Yes	SN 31268/REK
L	0013	SILVER	_< 0.0947	mg/L	0.1	n/a	0.1	Hn	SM_3120R/RLE
	0021	CHLORIDE	A, 4	mg/L	20	n/a	250	No	4500C1-B/RXI
	0022	SULFATE	7A. A	mg/L	50	n/a	250	llo .	4500G04E/AB
	0024	ZINC	<b>ማ, 5</b> 55	mg/L	0.2	5	5	No	SH 2120B/BLK

#### **EPA/STATE UNREGULATED (as source contaminants)**

0014	SODIUM	195	mg/L	5		n/a	34	CH CANGO ON P
0015	HARDNESS	100.	mg/L	10	-	n/a	H.	CH 23/00/Calculated
0016	CONDUCTIVITY		mg/L	70	n/a	700	E .	CN_25100 (00
0017	TURBIDITY	974	mg/L	0.1		n/a	Ver.	CH 010/80 (DD
0018	COLOR		mg/L	15	r/a_	15	1 mg	CH STORP IDLY
0026	TOTAL DISSOLVED SOLIDS (TDS)		mg/L	100	n/a_	500	4	SIL 2546-0/016
0009	LEAD	303.		0.001	0.015	n/a	80	31: 239: 2: 5[
0023	COPPER	0.0044		0.02	1.3	n/a	110	26 31 MAJ 6 6

#### **OTHER**

171	ORTHOPHOSPHATE	NA	mg/L	0.01			
172	SILICA	y.	mg/L	1.0			
402	ALUMINUM	HA	mg/L	0.05			
403	ALKALINITY	HA	mg/L	0.1			
404	MAGNESIUM	19.6	mg/L	0.01		No	SM D120B/RLK
405	CALCIUM	70.4	mg/L	0.5		No	SH 3120B/RLK
406	AMMONIA	HA	. mg/L	1.0			
	рН	na _					
	Total Organic Carbon	NA	mg/L				

105-151

024294

NOTES:

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your DOH drinking water regional office for further information.

MCL (maximum Confaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.

NA: Not Analyzed: In the results column, indicates this compound was not included in the current analysis.

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3019 G.S. Center Rd. Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

Send Results to:			Billing Addr	ess:	
This is your address la	bel, please type o	or print neatly	S		1 Campon
Mate Cassid	y I Jon R	ddus	In Rude	lus	Geo Engineer
Name 523 E 2 4	Ave		Name 523 E	ZIM AM	
Street Address			Street Address		
Spokane, WA City, State, Zip	44202		City, State, Zip	WA 99202	<u> </u>
185 - 766-0	110		City, State, Zip		
Phone #			Fax #		
Dri			ation (WSI) for		alysis
(i) System Nam		FI System ID	(3) Source #		ass (5) County  B  Dua M5
(6) Source Type (circ		AND A COLUMN TO THE PARTY OF TH			
		ll field Spring	g Purchased	l	
(7) Utility Name for t			A O and a second	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
(8) Sample Taken (cir	•		After treat	ment	
(9) Treatment Type (c. None	<i>ircie all that ap</i> Filtration	•	dation C	hlorination	Aeration
None	rmanon		uation C	mormation	Actation
The Mark State of the Control of the	Collected: 12	/15/08 (II)	Time of Collection	the second of th	C = C - C - C - C - C - C - C - C - C -
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(10) Date ( (11) Collect (13) Locat (14) Samp	Collected: 17.  Sted by: K, Collected by	ample site: RII approval of new so	Time of Collection  Telephone ( 78  1601 - 12508  ource? (circle one)  Yes No Fax N	5) 766 -0116 Yes No lo Yes \$5,00 P	>
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(10) Date ( (11) Collect (13) Locat (14) Samp	Collected: 17.  cted by: K. C.  tion of specific s le submitted for  Circle One: 1	ample site: REI approval of new so Report to D.O.H.  Pb/Cu  Fgit Labora	Time of Collection  Telephone ( 78  1601 - 12508  ource? (circle one)  Yes No Fax N	Yes No lo Yes \$5.00 P	>
(10) Date (11) Collect (13) Locat (14) Samp (15)  Comments: (15)  Lab Sam Sample submitted for	Collected: 17 cted by: K. Ce ion of specific s le submitted for Circle One: 1  No <sub>3</sub> 10C	ample site: REI approval of new so Report to D.O.H.  Pb/Cu  Fair Labora  Date	Time of Collection  Telephone (78  1401 - 12403  Durce? (circle one)  Yes No Fax N  IOC  Itory Use Only  Received	Yes No lo Yes \$5.00 P	repaid Fee
(10) Date (11) Collect (13) Locat (14) Samp (14) Samp (15)  Comments: (15)  Lab Sam  Sample submitted for (1) Regular monitor	Collected: 17 cted by: K. Ce ion of specific s le submitted for Circle One: 1  No <sub>3</sub> 10C	ample site: RE1 approval of new so Report to D.O.H.  Pb/Cu  Fall Labora  Date  2) Follow-up	Time of Collection  Telephone (78)  11301 - 121503  Durce? (circle one)  Yes No Fax N  IOC  Hory Use Only  Received  Of lab sample #	Yes No lo Yes \$5.00 P	repaid Fee
(10) Date (11) Collect (13) Locat (14) Samp (15)  Comments: (15)  Lab Sam Sample submitted for	Collected: 17 cted by: K. Ce ion of specific s le submitted for Circle One: 1  No <sub>3</sub> 10C	ample site: REI approval of new so Report to D.O.H.  Pb/Cu  Fair Labora  Date	Time of Collection  Telephone (78)  11301 - 121503  Durce? (circle one)  Yes No Fax N  IOC  Hory Use Only  Received  Of lab sample #	Yes No lo Yes \$5.00 P	repaid Fee
(10) Date (11) Collect (13) Locat (14) Samp (14) Samp (15)  Comments: (15)  Lab Sam  Sample submitted for (1) Regular monitor	Collected: 17.  cted by: K. C.  tion of specific s le submitted for Circle One: 1    No <sub>3</sub>     OC     ple #     (circle one):   ing	ample site: RE1 approval of new so Report to D.O.H.  Pb/Cu  Fall Labora  Date  2) Follow-up	Time of Collection  Telephone (78  11301 - 121503  Durce? (circle one)  Yes No Fax N  IOC  IOC  Itory Use Only  Received  Of lab sample #  on	Yes No lo Yes \$5.00 P	repaid Fee
(10) Date (11) Collect (13) Locat (14) Samp (14) Samp (15)  Comments: (15)  Lab Sam Sample submitted for (1) Regular monitor (3) Verification  Sample Preservation	Collected: 17.  cted by: K. C.  tion of specific s le submitted for Circle One: 1    No <sub>3</sub>     OC     ple #     (circle one):   ing	ample site: REI approval of new so Report to D.O.H.  Pb/Cu  Pb/Cu  2) Follow-up 4) Confirmati	Time of Collection  Telephone (78  11301 - 121503  Durce? (circle one)  Yes No Fax N  IOC  IOC  Itory Use Only  Received  Of lab sample #  on	Yes No lo Yes \$5.00 P  Other  Date	repaid Fee
(10) Date (11) Collect (13) Locat (14) Samp (14) Samp (15)  Comments: (15)  Lab Sam  Sample submitted for (1) Regular monitor (3) Verification  Sample Preservation (1) 4°C (2) p	Collected: 17.  cted by: K. C.  tion of specific s le submitted for Circle One: 1    No <sub>3</sub>     OC     ple #     (circle one):   ing	ample site: REI approval of new so Report to D.O.H.  Pb/Cu  Pb/Cu  2) Follow-up 4) Confirmati	Time of Collection  Telephone (78  11301 - 121503  Durce? (circle one)  Yes No Fax N  IOC  IOC  Itory Use Only  Received  Of lab sample #  on	Yes No lo Yes \$5.00 P  Other  Date	repaid Fee



3019 G.S. Center Rd. Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

CASCADE ANALYTICAL, INC.

\_illing Code: 10749

Batch #: 823956

### INORGANIC CONTAMINANTS (IOC) ANALYTICAL REPORT

Send Report to: Geo Engineers, Inc  523 E 2nd Ave  Spokane, WA 99202	Bill to: (Client Name) Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, VA 99202				
Date Collected: (MM/DD/YY) 12 /15 /08  Water System ID Number	System Group Type: (Circle one) A B Other: (Specify)  System Name: City of Rock Island				
Lab Sample Number 105-151 024317	County: Douglas				
Sample Location: RIMW03	Source Numbers(s),,,,				
Sample Purpose: (Check Appropriate Box)  RC - Routine/Compliance (satisfies monitoring requirements)  C - Confirmation (confirmation of chemical result)  I - Investigative (does not satisfy monitoring requirements)  O - Other (specify)	Date Received: (MM/DD/YY) 12 / 16 / 08  Date Received: (MM/DD/YY) 12 / 29 / 08  Reported  Date Received: (MM/DD/YY) 12 / 29 / 08  COMMENTS:				
Sample Composition: (Check Appropriate Box)  S - Single Source  B - Blended (List Multiple Source Numbers in Source Nos. field)  C - Composite (Specify In Comments field)  D - Distribution sample	Sample Type: (Check one) Pre-Treatment/Raw Post-Treatment/Finished Unknown  Sample Collected by: Client Phone Number:				

#### **EPA/STATE REGULATED (PRIMARY)**

DOH#	ANALYTE	RESULTS	UNITS	SRL	TRIGGER	MCL	MCL Exceeded	METHOD/Analyst Initials
0004	ARSENIC	0.0927	mg/L	0.003	0.010	0.010	No	SM 31138/BP
0005	BARIUM	0.047	mg/L	0.4	2	. 2	No	SM 3120B/RLK
0006	CADMIUM	< 0.0003	mg/L	0.002	0.005	0.005	No	SM 3113P/PP
0007	CHROMIUM	0.0048	mg/L	0.02	0.1	0.1	No	SM 3120B/RLK
0011	MERCURY	< 0.0003	mg/L	0.0004	0.002	0.002	No	EPA245. 1/BP
0012	SELENIUM	< 0.005	mg/L	0.01	0.05	0.05	No	SM 3113B/BP
0110	BERYLLIUM	< 0.0002	mg/L	0.0008	0.004	0.004	No	SM 3120B/RLK
0111	NICKEL	< 0.01	mg/L	0.01	0.1	0.1	No	SM 3120B/RLK
0112	ANTIMONY	< 0.005	mg/L	0.006	0.006	0.006	No	SM 3113B/BP
0113	THALLIUM	< 0.001	mg/L	0.002	0.002	0.002	Хо	EPA 200. 9/BP
0116	CYANIDE	< 0.01	mg/L	0.1	0.2	0.2	No	EPA335. 2/AB
0019	FLUORIDE	0.72	mg/L	0.5	4	4	No	4500F-C/TV0
0114	NITRITE-N	0.11	mg/L	0.2	0.5	1	No	4500NO2-F/CTG
0020	NITRATE-N	1. 04	mg/L	2	5	10	No	4500NO3-F/CTG
0161	TOTALNITRATENITRITE	1.15	mg/L	2	5	10	No	4500NO3-F/CTG

Form.#25

Rev. 8/06



3019 G.S. Center Rd, Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

Filling Code: 10749

Datch f: 823956

### INORGANIC CONTAMINANTS (IOC) ANALYTICAL REPORT

Send Report to: Den Engineers, Inc  523 E 2nd Ave  Spokane, VA 99002	Bill to: (Client Name) Gen Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202
Date Collected: (MM/DD/YY) 12 /15 /68	System Group Type: (Circle one) A B Other: (Specify)
Water System ID Number	System Name: Čitg of Rock Island
Lab Sample Number	County: [loug!aa
Sample Location: RIKW63	Source Numbers(s),,,,
Sample Purpose: (Check Appropriate Box)  A RC - Routine/Compliance (satisfies monitoring requirements)  C - Confirmation (confirmation of chemical result)  I - Investigative (does not satisfy monitoring requirements)  O - Other (specify)	Date Received: (MM/DD/YY) 12 / 16 / 98  ### ### ### ### ### ### ### ### ### #
Sample Composition: (Check Appropriate Box)  \[ \tilde{\ti	Sample Type: (Check one) Pre-Treatment/Raw Post-Treatment/Finished Unknown  Sample Collected by: 185-766-611

#### **EPA/STATE REGULATED (PRIMARY)**

DOH#	ANALYTE	RESULTS	UNITS	SRL	TRIGGER	MCL	MCL	METHOD/Analyst Initials
							Exceeded	
0004	ARSENIC	9, 9927	mg/L	0.003	0,010	0.010	Ro	SN 70108/8P .
0005	BARIUM	0.647	mg/L	0.4	2	2	₽0	SN DIOMETRIK
0006	CADMIUM	r a. 6363	mg/L	0.002	0.005	0.005	Ħn	58 21136/BP
0007	CHROMIUM	0.0048	mg/L	0.02	0.1	0.1	Ho	SK BIDOD/RLK
0011	MERCURY	. 2,6083	mg/L	0.0004	0.002	0.002	Ho	BPN245, 37BP
0012	SELENIUM	4 9, 605	mg/L	0.01	0.05	0.05	No	SR 3113K/BP
0110	BERYLLIUM	< 8.0000	mg/L	0.0008	0.004	0.004	lio .	SM 31208/RLK
0111	NICKEL	. 0.61	mg/L	0.01	0.1	0.1	Ho	SE STORFIEL
0112	ANTIMONY	c 6, 865 ·	mg/L	0.006	0.006	0.006	<b>5</b> 5	SM 01136/46
0113	THALLIUM	0.021	mg/L	0.002	0.002	0.002	ķē	Chaillea Fibb
0116	CYANIDE	< 6,61	mg/L	0.1	0.2	0.2	Er .	EF ADDS: 17/AF
0019	FLUORIDE	Ø. 72	mg/L	0.5	4	4	lic.	4569F-7 TNO
0114	NITRITE-N	0.11	mg/L	0.2	0.5	1	Hc.	450MNCC-F/C76
0020	NITRATE-N	) . (4)	mg/L	2 ·	5	10	Мэ	\$5 <b>%0</b> \$75-F7.CE5
0161	TOTAL NITRATE/NITRITE	1 1 2 E	mg/L	2	5	10	(Å)	SEMBROHE CTS

Form #25

DOH#	ANALYTE	RESULTS	<u>UNITS</u>	SRL	TRIGGER	MCL	>MCL? Exceeded	METHOD/Analyst Initials
8000	IRON	1, 90	mg/L	0.1	0.3	0.3	Yes	SN 3120B/RLK
0010	MANGANESE	0, 158	mg/L	0.01	n/a	0.05	Yes	SM 31200/RLK
0013	SILVER	< 0.0047	mg/L	0.1	n/a	0.1	No	SW_31208/RLK
0021	CHLORIDE	20.5	mg/L	20	n/a	250	No	4500C1-B/RNN
0022	SULFATE	66. 2	mg/L	50	n/a	250	No	4500S04E/A9
0024	ZINC	< 0.02	mg/L	0.2	5	5	No	SM 3120B/RLK

#### **EPA/STATE UNREGULATED (as source contaminants)**

0014	SODIUM	68.0	mg/L	5		n/a	No.	S# 31208/81K
0015	HARDNESS	159	mg/L	10	٠.	n/a	No.	SN 2340R/Calculated
0016	CONDUCTIVITY	587_	mg/L	70	n/a	700	No	SM 2510B/RP
0017	TURBIDITY	93.3	mg/L	0.1		n/a	Ypg	SN 2130P/RP
0018	COLOR	C 4	mg/L	15	n/a	15	No	SM 2120R/RLK
0026	TOTAL DISSOLVED SOLIDS (TDS)		mg/L	100	n/a	500		SK 2540-C/CTG
0009	LEAD			0.001	0.015	n/a	No	59A239, 2/BP
0023	COPPER	0, 8206		0.02	1.3	n/a	No	SH 31208/RLK

#### OTHER

171	ORTHOPHOSPHATE	KA	mg/L	0.01			
172	SILICA	NA	mg/L	1.0			
402	ALUMINUM	NA	mg/L	0.05			
403	ALKALINITY	NA	mg/L	0.1			
404	MAGNESIUM	13. 2	mg/L	0.01		No	SN 3120B/RLK
405	CALCIUM	41.8	mg/L	0.5	,	No	SM 3120B/RLK
406	AMMONIA	NA	mg/L	1.0			
}	pΉ	HA					
	Total Organic Carbon	NA	mg/L				

105-151

024317

#### NOTES:

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your DOH drinking water regional office for further information.

MCL (maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.

NA: Not Analyzed: In the results column, indicates this compound was not included in the current analysis,

Comments:	- Cony 1012	714 111	
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DOH#	ANALYTE	RESULTS	UNITS	SRL	TRIGGER	MCL	>MCL? Exceeded	METHOD/Analyst Initials
0008	IRON	1 50	mg/L	0.1	0.3	0.3	Yese	章 できながら10 F
0010	MANGANESE	Q 15A	mg/L	0.01	n/a	0.05	Yes	では、3×3所食/5年間
0013	SILVER	₹ @ \$39.5°°	mg/L	0.1	n/a	0.1	Mn	C者(106B/B) 程
0021	CHLORIDE	ግል ኻ	mg/L	20	n/a	250	lle.	45@6F1-P79M1
0022	SULFATE	65.0	mg/L	50	n/a	250	No	4566514F (6)
0024	ZINC	c (A (B))	mg/L	0.2	5	5	<b>f</b> lo	EM CLEADANE

#### **EPA/STATE UNREGULATED (as source contaminants)**

SODIUM	- 10-3	mg/L	5		n/a	и,	ru minativni ti vii valini kali
HARDNESS	160	mg/L	10	<b></b>	n/a	11.	CH DOUBLE Color lated
CONDUCTIVITY	rad	mg/L	70	n/a	700	n	
TURBIDITY	00 7	mg/L	0.1		n/a	¥-,=	Ch Dide ind
COLOR	_ , *;	mg/L	15	n/a	15	u <sub>e</sub>	THE STORE THE P
TOTAL DISSOLVED SOLIDS (TDS)		mg/L	100	n/a	500	75.	
LEAD	2,00.		0.001	0.015	n/a	64 	}
COPPER	5. 5613		0.02	1.3	n/a	160	27 82.03, 25 57 30 34 2657 17.6
	HARDNESS CONDUCTIVITY TURBIDITY COLOR TOTAL DISSOLVED SOLIDS (TDS) LEAD	HARDNESS CONDUCTIVITY TURBIDITY COLOR TOTAL DISSOLVED SOLIDS (TDS) LEAD	HARDNESS	HARDNESS   150   mg/L   10	HARDNESS	HARDNESS	HARDNESS

#### OTHER

171	ORTHOPHOSPHATE	u ș	mg/L	0.01			
172	SILICA	El &	mg/L	1.0			
402	ALUMINUM	K.V.	mg/L	0.05			
403	ALKALINITY	ķ t	mg/L	0.1			
404	MAGNESIUM	13.7	mg/L	0.01		No	SM 312WB/RLK
405	CALCIUM	91 4	mg/L	0.5		_60	SM STORRAPLE
406	AMMONIA	nλ	mg/L	1.0			
	pН	KA			]		
	Total Organic Carbon	NA.	mg/L				

105-151

024317

#### NOTES:

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your DOH drinking water regional office for further information.

MCL (maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.

NA: Not Analyzed: In the results column, indicates this compound was not included in the current analysis.

mments:	<del></del>	20-64	<u> </u>			 
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	•					
			<del></del>	 		

DOH#	ANALYTE	RESULTS	UNITS	SRL	TRIGGER	MCL	>MCL? Exceeded	METHOD/Analyst Initials
0008	IRON	3 54	mg/L	0.1	0.3	0.3	1.2.	CM North Exic
0010	MANGANESE	J (6.5	mg/L	0.01	n/a	0.05		The state of a
0013	SILVER	+ 0 39 × 9	mg/L	0.1	n/a	0.1	r)	CHI (1994) MOR
0021	CHLORIDE	5.8 N	mg/L	20	n/a	250	\$ 5	a4,-anniq orana
0022	SULFATE	14 B	mg/L_	50	n/a	250	11-	
0024	ZINC	4.27	mg/L	0.2	5	5	:1:	ens teather seat

#### **EPA/STATE UNREGULATED (as source contaminants)**

0014	SODIUM		mg/L	5		n/a		
0015	HARDNESS	55. 2 -	mg/L	10		r/a		NOTES AND ACA
0016	CONDUCTIVITY	* 12.5 	mg/L	70	n/a	700	5. F	100 (100 (100 (100 (100 (100 (100 (100
0017	TURBIDITY		mg/L	0.1		n/a		- 14
0018	COLOR	79.	mg/L	15	n/a	15	· ·	
0026	TOTAL DISSOLVED SOLIDS (TDS)		mg/L	100	n/a_	500	2,	
0009	LEAD			0.001	0.015	n/a	167	
0023	COPPER	₩. <b>₩.</b> 1, 1		0.02	1.3	n/a	ii	MEST W. E
		1/4 M 3/17/					14.	of a Cotton of

#### **OTHER**

171	ORTHOPHOSPHATE	va	mg/L	0.01			
172	SILICA	j: /	mg/L	1.0			
402	ALUMINUM	924	mg/L	0.05			
403	ALKALINITY	ts.)	mg/L	0.1			
404	MAGNESIUM	+ P <sub>2</sub> = P	_mg/L	0.01		N <sub>1.71</sub>	tige the least eye in
405	CALCIUM	\$4 <u>8</u>	mg/L	0.5		Y., 4,	OK 101 PAN 2019
406	AMMONIA	ķr	mg/L	1.0			
	рH	424	I				
	Total Organic Carbon	11.6	mg/L				

105-151

**904317** 

#### NOTES:

Comments: \_

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your DOH drinking water regional office for further information.

MCL (maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.

NA: Not Analyzed: In the results column, indicates this compound was not included in the current analysis.




3019 G.S. Center Rd. Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

Řev. 6/07

Send Results to. This is your address is		r print neatly	,	Billing Address:					
1	leleis			Sane					
Name				Name					
Street Address	Zm Mu			Street Address					
Spoleane,	MN 992	2.5		City, State, Zip					
City, State, Zip	1 209 281	V							
Phone #				Fax #					
Dri	nking Water	Sample I	nformati	on (WSI) fo	or Chemical And	llysis			
(1) System Nam	e: (2) W	FI System	ID	(3) Source	# (4) Cla	and vide to the field with all the			
(6) Source Type (circ		l l field	Surface Spring	Ground Purcha					
(7) Utility Name for	this Source:					<del></del>			
(B) Sample Taken (ci	rcle one): Befo	ore treatme	nt	After to	reatment				
(9) Treatment Type (6	circle all that app	ly routinely	v):						
None	Filtration		Fluoridati	on	Chlorination	Aeration			
Water Softe	ner Ozo	ne	UV light	Other _					
(13) Local (14) Samp	cted by:	mple site: approval of	new source	6? (circle one					
Comments: (15)	☐ No,	☐ Pb/	Cu	⊠ ioc	Other				
• • • • • •		FolL	aborator	y Use Only	<b>, , , , , , , ,</b>				
124217	nple # X M	polo	Dage Rec	eived 0 &	Date	Analyzed			
Sample submitted fo			, (						
1) Regular monitor	ing		-	ab sample #_					
3) Verification		4) Cor	nfirmation						
Sample Preservation 1) 4°C 2) p Lab Comments:	3) V	OC / Asco	rbic Acid	4) SOC	C / Sodium thiosulfate	e			
Des Commons.									
Customer Signature	my co	8			Date: 12-16-C	8			



(509) 662-1888 Fax: (509) 662-8183 3019 G.S. Center Road Wenatchee, WA 98801

(509) 452-7707

Batch: 823941

Client: Geo Engineers, Inc

Fax: (509) 452-7773 Client: Geo Engin 1008 W. Ahtanum Rd. Account: 02592 Union Gap, WA 98903 Sampler: K Cassidy

PO Number:

#### Analytical Services Report

Report Date: 1/15/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-C024295 Sample Identification: RI MW 01

Date Received: 12/15/08 Date Sampled: 12/15/08

Test Requested Results Units MDL Method Date Analyzed Flags
Radionuclide Analyzed by TAL/R 1/ 9/09

Approved By:

Cascade Analytical uses procedures established by EPA, ADAC, APHA, ASTH, and AWMA. Cascade Analytical makes no varranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.

Tuny Holsum



CASCADE ANALYTICAL, INC. 1-800-545-4206

(509) 662-1888 Fax: (509) 662-8183 3010 G.S. Center Road Wenatchee, WA 98801

(509) 452-7707

Batch: 823941

Client: Geo Engineers, Inc

Fax: (509) 452-7773 1008 W. Áhtanum Rd. Account: 02592

Union Gap, WA 98903 Sampler: K Cassidy

PO Number:

#### Analytical Services Report

Report Date: 1/15/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-C024295 Sample Identification: RI MW 01 Date Received: 12/15/08 Date Sampled: 12/15/08

Test Requested Date Analyzed Results Units MDI. Method Flags Radionuclide 1/ 9/09 Analyzed by TAL/R

Cascade Analytical uses procedures established by EPA, AOAC, APHA, ASTH, and AWNA. Cascade Analytical makes no warranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.



3019 G.S. Center Rd. Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

Send Results to:	Billing Address:
This is your address label, please type or print neatly	
Name County / Son Rudders	Name Ruddey Hotengineers In
523 E 2ml Ave	523 EZERLE 1 11
Street Address	Street Address
Spokani, NA 99202	Splane, WA 99202
City, State, Zip 785 766-0110	City, State, Zip
Phone #	Fax#
Drinking Water Sample Info	rmation (WSI) for Chemical Analysis
(1) System Name: (2) WFI System ID	
ROCK ASTAMO AAA	mw   A B Doyans
	rface Groundwater
(	ring Purchased
(7) Utility Name for this Source:	
(8) Sample Taken (circle one): Before treatment	After treatment
(9) Treatment Type (circle all that apply routinely):	
None Filtration Flu	oridation Chlorination Aeration
Water Softener Ozone UN	/ light Other
	VI MUOL - 17.1508 v source? (circle one) Yes No l. Yes No Fax No Yes \$5.00 Prepaid Fee
Comments: (15)	☐ IOC ☐ Other
Gross Alpha	
For Labo	oratory Use Only
Lab Sample # Do	nte Received Date Analyzed
34296 0 61 12	-11608
Sample submitted for (circle one):	
	up of lab sample #
3) Verification 4) Confirm	nation
Sample Preservation: (circle one): 1) 4°C 2) pH2 3) VOC / Ascorbic Lab Comments:	Acid 4) SOC / Sodium thiosulfate
Customer Signature W	Date: 17-15-08



TestAmerica Laboratories, Inc. 2800 George Washington Way Richland, WA 93354 Tel. (509) 375-3131 Fax (509) 375-5590

#### THE LEADER IN ENVIRONMENTAL TESTING

#### RADIONUCLIDE ANALYSES REPORT

System	ID No.:	System?	Vamo	e: City of Roc	k Is	land	·			
Lab/Sample No: 02839008 Date Collected				d: 12	: 12/15/08			DOH	DOH Source No: MW01	
Multiple Source Nos:				Sam	Sample Type: B			Sample Purpose: I		
Date Re	ceived: 12/17/08 @ 14:20	. Da	te R	eported: 1/13	/09			Supervi	isor: JC	
		Da	te A	nalyzed: 1/09	/09			Analyst	: LA	
County:	Douglas						Group	: Private		
Sample Location: RI MW01								<del></del>		
<del></del>	eport To: CASCADE ANALY	TICAL		-	В	ill To: Casc	ade Ana	vtical		
ll .	S CENTER ROAD					udy Brown		,,		
f	TCHEE, WA 98801				'	, · · ·				
j	138 / 39008 / K41XE				1	LIENT SAN	API E IF	# 08 <i>C</i> -2	4205	
DOH #	T	LA	D	RESULT		UNITS	<del>7</del>	<del></del>	MCL	(A NI A I NOMIC INIMITAL C)
DOR #	ANALITES	MI	_	RESULI		UNITS		ATE LYZED	MCL	(ANALYST'S INITIALS) & METHOD USED
	EPA/STATE	REGUL	ATE	D (These and	alyse	s should be			er as list	<u> </u>
165	Gross Alpha	3.0		18.5		pCi/L	1	9/09		TW / 900.0
166	Radium 228					pCi/L				TM / 904.0
	Determine Radium 226 activ	ity if Gro	ss Ai	lpha is greate	r the	n 5.0 pCi/L	*			
39	Radium 226*					pCi/L			<u> </u>	TM / 903.1
er	Determine Uranium activity	if Gross	4lph	a is greater th	ian i	15.0 pCi/L *	**			**************************************
105	Uranium** (mass)					μg/L			30	TN / ASTM D5174
105	Uranium** (activity)					pCi/L	20**			
	Depending on the foregoing	data dete	rmin	e the followir	1g (n		pleted if	data is a	· ·	) <u>:</u>
40	Radium 226 + 228					pCi/L			5	<u> </u>
40	Gross Alpha*** + Radium 2					pCi/L	<del> </del>		5	
41	Gross Alpha minus Uranium					pCi/L	<u> </u>		15	<u> </u>
	Do the following only if specifically requested by the client or the state									
42	Gross Beta***		$\dashv$			pCi/L	<del> </del>		50	
43 44	Tritium**** Strontium 90****		$\dashv$			pCi/L			20,000 8	
107	Cesium 134***	-	pCi/L			pCi/L	ļ — —		***	
107	Iodine 131****					pCi/L	<del> </del>		***	
VOTES										

NOTES:

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office. MDA: Minimum Detectable Amount.

NA (Not Analyzed): use in the results column for compounds not included in the current analysis.

ND (Not Detected): use in the results column for compounds analyzed and not detected at a level greater than or equal to the MDA.

\* If Gross Alpha is less than, or equal to, 5 pCi/L, it may be assumed that the Alpha activity is entirely due to Radium 226 (i.e., Radium 226 would not need to be run). The Alpha activity is then added to the Radium 228 activity (i.e., Beta activity) for MCL determinations. If the sum of the Alpha activity plus the Radium 228 activity is greater than 5 pCi/L, Radium 226 activity must then be determined for water system compliance purposes (i.e., Radium 226 + Radium 228 activity)

\*\* Uranium's MCL is given in mass terms (µg/L). When Uranium is determined by mass methods, it must be converted to activity levels (pCi/L) for calculation of the MCL (Gross Alpha less Uranium). A conversion factor of 0.67 pCi/l per µg/L should be used. Uranium needs to be determined only when the Gross Alpha exceeds 15 pCi/L.

\*\*\* Use Gross Alpha in lieu of Radium 226 when the Gross Alpha is less than, or equal to, 5.0 pCi/L

\*\*\*\* The MCL for beta particle and photon radioactivity from man-made radionuclides is the average annual concentration which shall not produ an annual dose equivalent to the total body or any internal organ greater than four millirem/yr.

Comments: All QC results are within acceptance limits unless noted on back.

MHITE - Submit with sample MELLOW - Offent Gody, PINK - Laboratory Cody

AGRICULTURE & **ENVIRONMENTAL ANALYSIS** 

> (509) 662-1888 Fax: (509) 662-8183 3019 G.S. Center Road Wenatchee, WA 98801 (509) 452-7707

## Sub-Contract ORDER FORM

	1-800-545-4206	Fax: (509) 452-7773 1008 W. Ahtanum Rd. Union Gap. Wa 98903			P.O. N	10:8239	71 12160
PRO	LITY OF FOCK -	delanip	CONTRACT L		T America	Richland	<u> </u>
;	T8L19013	8		280	o George	WAWAM	!
	J8L190139		CITY, STATE,	ZIP	. 1		•
	Das 01.1.	•	TELEPHONE	Ric	MIAND- MA	99354	·
<u></u>						<del></del>	
RELI	NOVISHED BY: Signature 1 DA	RELINQUISHED BY: S	gnature [2]	DATE R	ELINQUISHED BY: Sign	ature 3	DATE
(Print	wavet Thur /16			TIME (F	Printed)	· · · · · · · · · · · · · · · · · · ·	TIME
(, ,,,,,		(Franco)		''''	integr		, , , , , ,
REC	EIVED BY: Signature DA	TE RECEIVED BY: Signatu	ге	DATE R	ECEIVED BY: Signature		·DATE
1	1/1						
(Print	equilination The	/OR /IE (Printed)		TIME (F	Printed)		TIME
W	eyra Kitari 146	20					<u> </u>
	Sample I.D. OB C - 242	196 = RI	mulal		Sample Date	Sample Time	CR 4
1	ANALYSIS REQUESTED	RADINUCIÙE -	7	loha.		HIXE	, o me
	COMMENT	(	J	7			
	Sample I.D. 08C - 24		NW03	,	Sample Date 15	Sample Time	5 17/1
2	ANALYSIS REQUESTED	KADIMUOLIE -	puss Alp	sh.A		41XG1_	
	COMMENT		· · · · · · · · · · · · · · · · · · ·		Comple Date	(n	
	Sample I.D. ANALYSIS REQUESTED				Sample Date	Sample Time	
3							
	COMMENT    Sample I.D.				Sample Date	Sample Time	
	ANALYSIS REQUESTED						
4	COMMENT						
SPEU	IAL INSTRUCTIONS:	- 1 - 1 -					
	Kesnut	& Filling to	CAI/Wow	ATTAKE			
		Do NE KERNIT	/ /	<del></del>			
		EN 1801 NEJONI	21 NFCKI	within	other		

## Drinking Water Radiochemistry Analysis Request for Washington



PLEASE PRINT ALL INFORMATION.											
System I	d No: City of Eucli	IS/AU	DOH SOURCE NO: MWO3								
System Name:	Name: Name:										
System Name:											
Multiple	Source Nos:										
Sample T	Type: B A D	Purpose:	B (I) Group: A B Private								
County:	Doughs		Date Collected: 12-15-08								
Specific (	/ <b>)</b>	003-121508									
Send stat	e form to: 1 COPY OF FORM TO S	ENDING LAB AND	O 1 COPY TO DOH, IS POLICY.								
		٦									
	1	No- Miss	and - Awar inter								
		103, 027									
	24318										
DOH#	ANALYTES	MCL	Method								
39	RADIUM 226	3 pCi/L	EPA 903.1								
40	RADIUM 226+228	5 pCi/L	EPA 903.1 & 904.0								
41	GROSS ALPHA	15 pCi/L	EPA 900.0								
42											
	43 Tritium - EPA 906.0										
44	Strontium-90 - EPA 905.0										
	Radium-228 3pCi/L EPA 904.0										
		A UNREGUI									
105	105 Total Uranium - ASTM D5174										
[	Radon-222 - EPA 913.0										

Please ship samples to:

Test America Laboratories, Inc.

2800 George Washington Way Richland, WA 99354

(509) 662-1888 Fax: (509) 662-8183 3019 G.S. Center Poad Wenatchee, WA 98801



(509) 452-7707

Batch: 823957 Client: Geo Engineers, Inc

Union Gap, WA 98903 Sampler: K Cassidy

PO Number:

#### Analytical Services Report

Report Date: 1/15/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-C024318 Sample Identification: RI MW03 Date Received: 12/16/08 Date Sampled: 12/15/08

Test Requested Results Units MDL Method Date Analyzed Flags \_\_\_\_\_\_ Radionuclide Analyzed by TAL/R 1/ 9/09

Approved By: Chily Hawin

Cascade Analytical uses procedures established by EPA, AOAC, APHA, ASTM, and AWWA. Cascade Analytical makes no warranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.



(509) \$62-1888 Fax: (509) 662-8183 3019 G.S. Center Road Wenatchee, WA 98801

(509) 452-7707 Fax: (509) 452-7773

ch: A23957 nt: Geo Engineers, Inc

1008 W. Ahtanum Rd. Account: 02592

Union Gap, WA 98803 Sampler: K Cassidy

PO Number:

#### Analytical Services Report

Report Date: 1/15/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-0024318 Sample Identification: RI MV03 Date Received: 12/16/08

. . . Date Sampled: 12/15/08

Test Requested Results Units NDL Method Date Analyzed Flags 1/ 9/09 Radionuclide Analyzed by TAL/R

Cascade Analytical uses procedures established by EPA, ACAC, APHA, ASTM, and AWWA. Cascade Analytical makes no warranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis:



3019 G.S. Center Rd. Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

Rev. 6/07

Send Results to:	Billing Address:
This is your address label, please type or print neatly	
Jon luddles	Same ) j
Name 523 E 2rd Ave	Name
Street Address	Street Address
City, State, Zip	City, State, Zip
301 209 2817	
Phone #	Fax #
	nation (WSI) for Chemical Analysis
(1) System Name; (2) WFI System ID	(3) Source # (4) Class (5) County A B
(6) Source Type (circle one): Well Surfa Well field Sprin	
(7) Utility Name for this Source:	,
(8) Sample Taken (circle one): Before treatment	After treatment
(9) Treatment Type (circle all that apply routinely):	
	idation Chlorination Aeration
Water Softener Ozone UV I	ght Other
(11) Collected by: 14 Cassicky (13) Location of specific sample site. 12 (14) Sample submitted for approval of new s	
Comments: (15) No <sub>3</sub> Pb/Cu	Other
Gross Alpha	
Par Labor	atory Use Only
Lab Sample # 1 1 Date 12	Received Date Analyzed
Sample submitted for (circle one):	
<ol> <li>Regular monitoring</li> <li>Follow-up</li> <li>Verification</li> <li>Confirmat</li> </ol>	of lab sample #
5) Vermeation 4) Communa	ion
Sample Preservation: (circle one):  1) 4°C  2) pH2  3) VOC / Ascorbic Action (Circle one):	eid 4) SOC / Sodium thiosulfate
Lab Comments:	
Customer Signature LADA & D	Date: 12-15-08



TestAmerica Laboratories, Inc. 2800 George Washington Way Richland, WA 93354 Tel. (509) 375-3131 Fax (509) 375-5590

#### THE LEADER IN ENVIRONMENTAL TESTING

RADIONUCLIDE ANALYSES REPORT

System ID No.: City of RockIsland System Name:								
Lab/Sample No: 02839018	ate Collected	l: 12/15/08			DOH Source No: MW03			
Multiple Source Nos:	Sample Type: B			Sample Purpose: I				
Date Received: 12/17/08 @ 14:20	ported: 1/13/0	19		Supervisor	: JC			
	Date Ar	nalyzed: 1/09/0	)9		Analyst: T	t: TW		
County: Douglas				Group:	Private			
Sample Location: RIMW03-121508								
Send Report To: CASCADE ANALYTIC.	AL		Bill To: Casc	ade Analy	/tical			
3019 G.S CENTER ROAD			Judy Brown	•				
WENATCHEE, WA 98801			•					
J8L190138 / 39008 / K41XG			CLIENT SAN	MPLE ID:	# 08C-2431	18		
DOH # ANALYTES	LAB	RESULTS	UNITS	DA	TE M	1CL	(ANALYST'S INITIALS)	
	MDA		<u> </u>	ANAL	YZED		& METHOD USED	
EPA/STATE REC	GULATE	O (These anal	yses should be	performe	d in order a	as list		
165 Gross Alpha	2.78	3.38	pCi/L	1/9	/09		TW / 900.0	
166 Radium 228			pCi/L	<u> </u>			TM / 904.0	
Determine Radium 226 activity if	Gross Al	pha is greater	than 5.0 pCi/L	*				
39 Radium 226*			pCi/L	<u></u>			TM / 903.1	
Determine Uranium activity if Gr	oss Alpha	is greater tha	in 15.0 pCi/L	**				
105 Uranium** (mass)			μg/L	<u> </u>		30	TN / ASTM D5174	
105 Uranium** (activity)	l		pCi/L	<u> </u>	2	0**		
Depending on the foregoing data	determin	e the following	(must be com	pleted if d	lata is avail	lable)		
40 Radium 226 + 228			pCi/L			5		
40 Gross Alpha*** + Radium 228			pCi/L			5		
41 Gross Alpha minus Uranium			pCi/L	<u> </u>		15		
Do the following only if specifical	Do the following only if specifically requested by the client or the state							
42 Gross Beta***		· · · · · · · · · · · · · · · · · · ·	pCi/L			50		
43 Tritium****			pCi/L	<u> </u>	20	,000		
44 Strontium 90****			pCi/L			8		
107 Cesium 134****			pCi/L			***		
						***		

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office. MDA: Minimum Detectable Amount.

NA (Not Analyzed): use in the results column for compounds not included in the current analysis.

ND (Not Detected): use in the results column for compounds analyzed and not detected at a level greater than or equal to the MDA.

- \* If Gross Alpha is less than, or equal to, 5 pCi/L, it may be assumed that the Alpha activity is entirely due to Radium 226 (i.e., Radium 226 would not need to be run). The Alpha activity is then added to the Radium 228 activity (i.e., Beta activity) for MCL determinations. If the sum of the Alpha activity plus the Radium 228 activity is greater than 5 pCi/L, Radium 226 activity must then be determined for water system compliance purposes (i.e., Radium 226 + Radium 228 activity)
- \*\* Uranium's MCL is given in mass terms (µg/L). When Uranium is determined by mass methods, it must be converted to activity levels (pCi/L) for calculation of the MCL (Gross Alpha less Uranium). A conversion factor of 0.67 pCi/l per µg/L should be used. Uranium needs to be determined only when the Gross Alpha exceeds 15 pCi/L.

\*\*\* Use Gross Alpha in lieu of Radium 226 when the Gross Alpha is less than, or equal to, 5.0 pCi/L

\*\*\*\* The MCL for beta particle and photon radioactivity from man-made radionuclides is the average annual concentration which shall not pr an annual dose equivalent to the total body or any internal organ greater than four millirentlyr. Comments: All OC results are within acceptance limits unless noted on back.

## Drinking Water Radiochemistry Analysis Request for Washington



PLEASE PRINT ALL INFORMATION.											
System I	d No: City of focu-	USTAND	DOH SOURCE NO: MINO(								
System											
Name:											
System											
	Name:										
Multiple	Source Nos:										
Sample T	Type: (B) A T	Purpose:	B (I) Group: A B Private								
County:	DOMAS		Date Collected: 12-15-08								
Specific (	Collection Location: PI	mwal									
Send stat	e form to 1 COPY OF FORM TO S		O 1 COPY TO DOH, IS POLICY.								
	ه(ك	NOT KEEP	out sure only								
		g	U								
a	80-24795										
DOH#	ANALYTES	MCL	Method								
39	RADIUM 226	3 pCi/L	EPA 903.1								
40	RADIUM 226+228	5 pCi/L	EPA 903.1 & 904.0								
41	GROSS ALPHA	15 pCi/L	EPA 900.0								
42	GROSS BETA	50 pCi/L	EPA 900.0								
43											
44	Strontium-90 - EPA 905.0										
	Radium-228 3pCi/L EPA 904.0										
EPA UNREGULATED											
105											
	Radon-222 - EPA 913.0										

Please ship samples to:

Test America Laboratories, Inc.

2800 George Washington Way Richland, WA 99354



(509) 662-1888 Fax: (509) 662-8183 3019 G.S. Center Road Wenatchee, WA 98801

(509) 452-7707

Fax: (509) 452-7773 1008 W. Ahtanum Rd. Union Gap, WA 98903 Batch: 824681

Client: Geo Engineers, Inc

Account: 02592

Sampler: K Cassidy

PO Number:

#### Analytical Services Report

Report Date: 1/19/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-C024319 Sample Identification: RI MW03 Date Received: 12/16/08 Date Sampled: 12/15/08

Test Requested	Results	Units	MDL	Method	Date Analyzed	Flags
SOC Package	SOC Packa		*******	**********		
524.2 VDC Method Drink W	Analyzed	-		EPA 524.2	12/24/08	
515.1 Chlorophenoxy Herb	Analyzed	•		EPA 515.1	12/23/08	
525.2 SOCs	Analyzed	by WML		EPA 525.2	12/19/08	• •
531.1 Carbamate Pesticide	Analyzed	by WML		EPA 531.1	12/17/08	•

Approved By: Juny Horn Cascade Analytical uses procedures established by EPA, AOAC, APHA, ASTM, and ANNA. Cascade Analytical makes no varranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.



(509) 662-1888 Fax: (509) 662-8183 3019 G.S. Center Road Wenatchee, WA 98801

(509) 452-7707 Fax: (509) 452-7773 1008 W. Ahtanum Rd. Batch: 824681

Client: Geo Engineers, Inc

1008 W. Ahtanum Rd. Account: 02592 Union Gap, WA 98903

Sampler: K Cassidy

PO Number:

#### Analytical Services Report --

Report Date: 1/19/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-C024319 Sample Identification: RI NW03 Date Received: 12/16/08

Date Sampled: 12/15/08

Results Units	MDL Method	Date Analyzed	Flags
SOC Package		All the was not that the fact on the day and the tab ob-	*
•	EPA 524.2	12/24/08	
Analyzed by WML	EPA 515.1	12/23/08	
Analyzed by WML	EPA 525.2	12/19/08	
Analyzed by WML	EPA 531.1	12/17/08	Carry J.
	SOC Package Analyzed by WML Analyzed by WML Analyzed by WML	SOC Package Analyzed by WML EPA 524.2 Analyzed by WML EPA 515.1 Analyzed by WML EPA 525.2	SOC Package Analyzed by WML EPA 524.2 12/24/08 Analyzed by WML EPA 515.1 12/23/08 Analyzed by WML EPA 525.2 12/19/08

Approved By:

Cascade Analytical uses procedures established by EPA, ADAC, APHA, ASTM, and AWWA. Cascade Analytical makes no warranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.

Customer Signature \_



3019 G.S. Center Rd. Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

		ENSCRUE A	MALITICAL, INC	<b>-</b> (	
Send Results to: This is your address label, p	lease type o	r print neatly	Billing Ac	ldress:	
don Rudd	£. X		Stine		
Name F 73 C 2	Jed Ar	^	Name		
Street Address	9970		Street Addres	s	
City, State, Zip			City, State, Zi	p	
509 70°	7 281	!	Fax #		
	g Water	Sample Inform		or Chemical And	alvsis
ursystem Name:		FI System ID		03 A	
(6) Source Type (circle one		l Surfac l field Spring			
(7) Utility Name for this So					
(8) Sample Taken (circle of		ore treatment	After t	reatment	
(9) Treatment Type (circle			4-41	Olderin dien	A second
None F Water Softener	iltration Ozo	Fluorione UV lig	-	Chlorination	Aeration
(13) Location of	specific sa mitted for	imple site: 12.T approval of new so	MLX3-171 urce? (circle one	35) 766-011 508 ) Yes No No Yes \$5.00 P	
Comments: (15)	No <sub>3</sub>	Pb/Cu	loc	Other	
SOC 515.Z.	525,2	531.1, VOC	524.2		
	_ \ \	For Labora	tory Use Onl	y	• • • • • • •
Lab Sample #	M	Date 1	Received 14 090	Date	Analyzed
Sample submitted for (circ	le one):				
<ol> <li>Regular monitoring</li> <li>Verification</li> </ol>	•	2) Follow-up 4) Confirmation	•		
J) VOLINCATION	•	T) Comminant	V11		
Sample Preservation: (circ 1) 4°C 2) pH2	-	OC / Ascorbic Aci	d 4) SO(	C / Sodium thiosulfat	e
Lab Comments:	<del></del>				
· ·					
Customer Signature	1 /2 ·	$\sim$ $\sim$		Date: 12-16-0	<u> </u>

#### SYNTHETIC ORGANIC CHEMICALS (SOC's) ANALYSIS REPORT EPA TEST METHOD - 525.2

System ID No.: N/A	System Name: City of Roo	k Island_			
Lab/Sample No.: 08987634	Date Collected:	12/15/08	DOH Source No.: N/A		
Multiple Source Nos.: N/A		Sample Type: B	Sample Purpose: I		
Date Received: 12/17/08	Date Reported: 12/23/08	Superv	Ilsor: LMA		
/Date Extracted: 12/17/08	Date Analyzed: 12/19/08				
County: Grant		Group: Priv	ate		
Sample Location: MW #3					
Send To: Cascade Analytical,	Inc.	Remar	ks: 08C-24319		
3019 GS Center Road	i				
Wenatchee, WA 988	01				

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCE	EDS
		EPA REGULATED					Trigger?	MCL?
33	Endrin	ND	ug/L	0.02	0.02	2	NO	NO
34	Lindane (HCH gamma)	ND	ug/L	0.04	0.04	0.2	NO	NO
35	Methoxychlor	ND	ug/L	0.2	0.2	40	NO	NO
36	Toxaphene	ND	ug/L	2	2	3	NO	NO
117	Alachior	ND	ug/L	0.4	0.4	2	NO	NO
119	Atrazine	ND	ug/L	0.2	0.2	3	NO	NO
120	Benzo(a)pyrene	ND	_ug/L	0.04	0.04	0.2	NO	NO
122	Chlordane (total)	ND	ug/L	0.4	0.4	2	NO	NO
124	DI(ethylhexyl)adipate	ND	ug/L	1.3	1.3	400	NO	NO
125	Di(ethylhexyl)phthalate	ND	ug/L	1.3	1.3	6	NO	NO
126	Heptachlor	ND	ug/L	80.0	0.08	√0.4	NO	NO
127	Heptachlor epoxide	ND	ug/L	0.04	0.04	0.2	NO	NO
128	Hexachlorobenzene	ND	ug/L	0.2	0.2	1	NO	NO
129	Hexachlorocyclopentadie	ne ND	ug/L	0.2	0.2	50	NO	NO
133	Simazine	ND	ug/L	0.15	0.15	4	NO	NO
134	Pentachlorophenol	ND	ug/L	0.08	0.08	1	NO	NO
· · · · · · · · · · · · · · · · · · ·		EPA UNREGULATED			Medalisan para PAS Badanya ya Sari			
118	Aldrin	ND	ug/L	0.2	0.2		NO	
121	Butachlor	ND	ug/L	0.4	0.4		NO	
123	Dieldrin	ND	ug/L	0.2	0.2		NO	
130	Metolachior	ND	ug/L	1	1		NO	
131	Metribuzin	ND ND	ug/L	0.2	0.2		NO	
132	Propachlor	ND	ug/L	0.2	0.2		NO	
154	Fluorene	ND	ug/L	0.2	0.2		NO	
		STATE UNREGULATED						:
153	PCB (as total arochlors)	ND	ug/L	0.2	0.2		NO	
173	Arochlor 1221	ND	ug/L	0.5	0.5		NO	
174	Arochlor 1232	ND	ug/L	0.1	0.5		NO	
175	Arochlor 1242	ND	ug/L	0.1	0.3		NO	
176	Arochlor 1248	ND	ug/L	0.1	0.1		NO	

#### Lab/Sample No.: 08987634

Water Management Laboratories, Inc.

1515 80th St. E. Tacoma, WA 98404 (253) 531-3121

DOH#	ANALYTES	53) 531-3121 RESULTS	UNITS	SRL	TRIGGER	MCL	EXCE	EDS
		STATE UNREGULATED					Trigger?	MCL?
177	Arochlor 1254	ND ND	ug/L	0.1	0.1		NO	
178	Arochlor 1260	ND	ug/L	0.1	0.2		NO	
179	Bromacil	ND	ug/L	0.2	0.2		NO	
180	Arochlor 1016	ND	ug/L	0.2	0.2		NO	
183	Prometon	ND	ug/L	0.2	0.2		NO	
190	Terbacil	ND	ug/L	0.2	0.2		NO	
202	Diazinon	ND	ug/L	0.2	0.2		NO	
208	EPTC	ND	ug/L	0.3	0.3		NO	
230	Heptachlor Epoxide 'B'	NA	ug/L	0.2	0.2			
232	4,4' - DDD	ND	ug/L	0.2	0.2		NO	
233	4,4' - DDE	ND	ug/L	0.2	0.2		NO	
234	4,4' - DDT	ND	ug/L	0.2	0.2		NO	
236	Cyanazine	ND	ug/L	0.2	0.2	_	NO	
239	Malathion	ND	ug/L	0.2	0.2		NO	
240	Parathion	ND ND	ug/L	0.2	0.2		NO	
243	Trifluralin	ND	ug/L	0.2	0.2		NO	
244	Acenaphthylene	ND	ug/L	0.2	0.2		NO	
245	Acenaphthene	ND	ug/L	0.2	0.2		NO	
246	Anthracene	ND	ug/L	0.2	0.2	_	NO	
	Benzo (a) Anthracene	ND	ug/L	0.2	0.2		NO	
	Benzo (b) Fluoranthene	ND	ug/L	0.2	0.2		NO	
249	Benzo (g,h,i) Perylene	ND	ug/L	0.2	0.2		NO	
	Benzo (k) Fluoranthene	ND	ug/L	0.2	0.2		NO	
251	Chrysene	ND	ug/L	0.2	0.2		NO	
	Dibenzo (a,h) Anthracene		ug/L	0.2	0.2	_	NO	
	Fluoranthene	ND	ug/L	0.2	0.2		NO	
255	Indeno (1,2,3-cd) Pyrene	ND	ug/L	0.2	0.2		NO	
256	Phenanthrene	ND ND	ug/L	0.2	0.2		NO	
257	Pyrene	ND	ug/L	0.2	0.2		NO	
258	Benzyl Butyl Phthalate	ND	ug/L	0.6	0.6		NO	
	Di - n -Butyl Phthalate	ND	ug/L	0.6	0.6		NO	
	Diethyl Phthalate	ND	ug/L	0.6	0.6		NO	
261	Dimethyl Phthalate	ND	ug/L	0.6	0.6		NO	
319	Heptachlor Epoxide 'A'	NA NA	ug/L	0.2	0.2			
	Acetochlor	ND	· ug/L					
	Molinate	ND	ug/L					
	2,4-Dinitrotoluene	ND	ug/L					
	2,6-Dinitrotoluene	ND	ug/L					

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): In the RESULTS column Indicates this compound was not included in the current analysis.

ND (Not Detected):In the RESULTS column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

Comments: Sample was analyzed in accordance with DOH memo dated 03/04/98.

Method 525: Pesticides

## SYNTHETIC ORGANIC CHEMICALS (SOC's) ANALYSIS REPORT EPA TEST METHOD - 515.1

System ID No.: N/A	System Name: City of Roc	k Island		
Lab/Sample No.: 08987634	Date Collected:	12/15/08		DOH Source No.: N/A
Multiple Source Nos.: N/A		Sample Type	e: B	Sample Purpose: I
Date Received: 12/17/08	Date Reported: 12/24/08		Superviso	r: hulf
/Date Extracted: 12/17/08	Date Analyzed: 12/23/08		Analyst: V	VMA
County: Grant		Grou	p: Private	
Sample Location: MW #3				
Send To: Cascade Analytical, Inc.			Remarks:	08C-24319
3019 GS Center Road			1	
Wenatchee, WA 98801				

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCE	EDS
		EPA REGULATED					Trigger?	MCL?
37	2,4 - D	ND	ug/L	0.2	0.2	70	NÓ	NO
38	2,4,5 - TP (Silvex)	ND	ug/L	0.4	0.4	50	NO	NO
134	Pentachlorophenol	ND	ug/L	0.08	0.08	1	NO	NO
137	Dalapon	ND	ug/L	2.0	2.0	200	NO	NO
139	Dinoseb	ND	ug/L	0.4	0.4	7	NO	NO
140	Picloram	ND	ug/L	0.2	0.2	500	NO	NO
en de la company		EPA UNREGULATED						
138	Dicamba	ND	ug/L	0.2	0.2		NO	
		STATE UNREGULATED						
135	2,4 - DB	ND	ug/L	1.0	1.0		NO	
136	2,4,5 - T	ND	ug/L	0.4	0.4		NO	
220	Bentazon	ND	ug/L	0.5	0.5		NO	
221	Dichlorprop	ND	ug/L	0.5	0.5		NO	
223	Acifluorfen	ND	ug/L	2.0	2.0		NO	
225	DCPA acid metabolites (A)	ND	ug/L	0.1	0.1		NO	
226	3,5 - Dichlorobenzoic Acid	ND	ug/L	0.5	0.5		NO	
	отн	ER COMPOUNDS (Option	CONTROL AND PROPERTY AND PARTY AND PARTY.					A torsyn i ri Glogiji Pile
224	Chloramben	ND	ug/L	0.2				
228	4 - Nitrophenol	ND	ug/L	0.2				

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): In the RESULTS column Indicates this compound was not included in the current analysis.

ND (Not Detected): In the RESULTS column Indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

< : Indicates less than.

Comments:

Method 515.1: Herbicides

## SYNTHETIC ORGANIC CHEMICALS (SOC's) ANALYSIS REPORT EPA TEST METHOD - 531.2

System ID	) No.: N/A	System Name: City of Roc	k Island		
Lab/Samp	ole No.: 08987634	Date Collected:	12/15/08		DOH Source No.: N/A
Multiple S	Source Nos.: N/A		Sample Type	e: B	Sample Purpose: I
Date Rece	eived: 12/17/08	Date Reported: 12/19/08		Superviso	: DM
Date Extracted: N/A Date		Date Analyzed: 12/17/08	Pate Analyzed: 12/17/08		RB
County: C	Grant		Grou	p: Private	
Sample L	ocation: MW #3				
Send To:	Cascade Analytical, Inc			Remarks:	08C-24319
 	3019 GS Center Road				
	Wenatchee, WA 98801				

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXC	EDS
		EPA REGULATED					Trigger?	MCL?
146	Carbofuran	ND	ug/L	2.0	2.0	40	NO	NO
148	Oxamyl	ND	ug/L	4.0	4.0	200	NO	NO
		EPA UNREGULATED						
141	3 - Hydroxycarbofuran	ND	ug/L	2.0	2.0		NO	
142	Aldicarb	ND	ug/L	1.0	1.0		NO	
143	Aldicarb Sulfone	ND	ug/L	0.7	0.7		NO	
144	Aldicarb Sulfoxide	ND	ug/L	1.8	1.8		NO	
145	Carbaryl	ND	ug/L	2.0	2.0		NO	
147	Methornyl	ND	ug/L	1.0	4.0		NO	
	011	IER COMPOUNDS (OPTION						
326	Baygon	ND	ug/L	1.0				
327	Methiocarb	ND	ug/L	4.0				

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may need to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): In the RESULTS column indicates this compound was not included in the current analysis.

ND (Not Detected): In the RESULTS column indicates this compound was analyzed and not detected at a level greater than the SRL.

<: Indicates less than.

Comments:

### VOLATILE ORGANIC CHEMICALS (VOC's) ANALYSIS REPORT EPA TEST METHOD - 524.2

System ID No.: N/A	System Name: City of R	System Name: City of Rock Island					
Lab/Sample No.: 08977414	Date Collected:	12/15/2008		DOH Source No.: N/A			
Multiple Source Nos.: N/A		Sample Type: E	3	Sample Purpose: I			
Date Received: 12/17/2008	Date Analyzed: 12/22/20	008	Analyst:	LHL			
	Date Reported: 12/24/2008 Super		Supervis	or: LNA			
County: Douglas		Group:					
Sample Location: MW #3							
Send To: Cascade Analytical Inc.			Remarks	s: 08C-24319			
3019 G.S. Center Road			1				
Wenatchee, WA 98801							

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEED	5
		EPA REGULATED					Trigger?	MCL?
45	Vinyl Chloride	ND	ug/L	0.5	0.5	2	NO	NO
46	1,1 - Dichloroethylene	ND	ug/L	0.5	0.5	7	NO	NO
47	1,1,1 - Trichloroethane	ND	ug/L	0.5	0.5	200	NO	NO ,
48	Carbon Tetrachloride	ND	ug/L	0.5	0.5	5	NO	NO
49	Benzene	ND	ug/L	0.5	0.5	5	NO	NO
50	1,2 - Dichloroethane	ND	ug/L	0.5	0.5	5	NO	NO
51	Trichloroethylene	ND	ug/L	0.5	0.5	_ 5	NO	NO
52	1,4 - Dichlorobenzene	ND	ug/L	0.5	0.5	75	NO	NO
56	Dichloromethane	ND	ug/L	0.5	0.5	5	NO	NO
57	trans-1,2 - Dichloroethylene	ND	ug/L	0.5	0.5	100	NO	NO
60	cis-1,2 - Dichloroethylene	ND	ug/L	0.5	0.5	70	NO	NO
63	1,2 - Dichloropropane	ND	ug/L	0.5	0.5	5	NO	NO
66	Toluene	ND	ug/L	0.5	0.5	1000	NO	NO
67	1,1,2 - Trichloroethane	ND	ug/L	0.5	0.5	5	NO	NO
68	Tetrachloroethylene	ND	ug/L	0.5	0.5	5	NO	NO
71	Chlorobenzene	ND	ug/L	0.5	0.5	100	NO	NO
73	Ethylbenzene	ND	ug/L	0.5	0.5	700	NO	NO
76	Styrene	ND	ug/L	0.5	0.5	100	NO	NO
84	1,2 - Dichlorobenzene	ND	ug/L	0.5	0.5	600	NO	NO
95	1,2,4 - Trichlorobenzene	ND	ug/L	0.5	0.5	70	NO	NO
160	Total Xylenes	ND ND	ug/L	0.5	0.5	10000	NO	NO
74	m/p Xylenes (MCL for Total)	ND	ug/L	0.5	0.5		NO	
75	o - Xylene (MCL for Total)	ND	ug/L	0.5	0.5		NO	
		EPA UNREGULATED				- 1		
27	Chloroform	ND	ug/L	0.5	0.5		NO	
28	Bromodichloromethane ·	ND	ug/L	0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/L	0.5	0.5		NO	
30	Bromoform_	ND	ug/L	0.5	0.5		NO	
53	Chloromethane	ND	ug/L	0.5	0.5		NO	
54	Bromomethane	ND	ug/L	0.5	0.5		NO	
55	Chloroethane	ND	ug/L	0.5	0.5		NO	

Lab/Sample No.: 08977414

Water Management Laboratories, Inc. 1515 80th St. E. Tacoma, WA 98404 (253) 531-3121

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEEDS	
	ER	A UNREGULATED (Conti	nued)				Trigger?	MCL?
58	1,1 - Dichloroethane	ND	ug/L	0.5	0.5		NO	
59	2,2 - Dichloropropane	ND	ug/L	0.5	0.5		NO	
62	1,1 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
64	Dibromomethane	ND	ug/L.	0.5	0.5		NO	
70	1,3 - Dichloropropane	ND	ug/L	0.5	0.5		NO	
72	1,1,1,2 - Tetrachlroroethane	ND	ug/L	0.5	0.5		NO	
78	Bromobenzene	ND	ug/L	0.5	0.5		NO	
79	1,2,3 - Trichloropropane	ND	ug/L	0.5	0.5		NO	
80	1,1,2,2 - Tetrachloroethane	ND	ug/L	0.5	0.5		NO	
81	o - Chlorotoluene	ND	ug/L	0.5	0.5		NO	
82	p - Chlorotoluene	ND	ug/L	0.5	0.5		NO	
83	m - Dichlorobenzene	ND	ug/L	0.5	0.5		NO	
154	1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
The second of th		STATE UNREGULATED						
65	cis-1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
69	trans-1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
85	Fluorotrichloromethane	ND	ug/L	0.5	0.5		NQ	<del></del>
86	Bromochloromethane	ND	ug/L	0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/L	0.5	0.5		NO	
88	n - Propylbenzene	ND	ug/L	0.5	0.5		NO	
89	1,3,5 - Trimethylbenzene	ND	ug/L	0.5	0.5		NO	
90	t - Butylbenzene	ND	ug/L	0.5	0.5		NO	
91	1,2,4 - Trimethylbenzene	ND	ug/L	0.5	0.5		NO	
92	s - Butylbenzene	ND	ug/L	0.5	0.5		NO	
93	p - Isopropyltoluene	ND	ug/L	0.5	0.5		NO	
94_	n - Butylbenzene	ND	ug/L	0.5	0.5		NO	
96	Napthalene	ND	ug/L	0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/L	0.5	0.5		NO	
98	1,2,3 - Trichlorobenzene	ND	ug/L	0.5	0.5		NO	
102	EDB (Confirm by 504.1)	ND	ug/L	0.5	0.5		NO	
103	DBCP (Confirm by 504.1)	ND	ug/L	0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/L.	0.5	0.5		NO	
N/A	MTBE	ND	ug/L	0.5	0.5		NO	

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may need to take additional samples. Contact your regional DOH office for further information.

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NA (Not Analyzed): In the RESULTS column indicates this compound was not included in the current analysis.

ND (Not Detected): In the RESULTS column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

< : Indicates less than.

#### Comments:

A maximum contaminant level of 80 ug/L total Trihalomethanes (Compounds 27-30) is allowed.

Method 524.2: VOC's



(509) 662-1898 Fax: (509) 662-8183 3019 G.S. Center Road Wenatchee, WA 98801

COPY

(509) 452-7707 Fax: (509) 452-7773 Batch: 823942

Client: Geo Engineers, Inc

1008 W. Ahtanum Rd. Account: 02592 Union Gap, WA 98903

<sup>93</sup> Sampler: K Cassidy

PO Number:

#### Analytical Services Report --

Report Date: 1/19/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-C024296 Sample Identification: RI MW 01 Date Received: 12/15/08 Date Sampled: 12/15/08

Test Requested	Results		MDL	Method	Date Analyzed	Flags
SOC Package 524.2 VOC Method Drink W 515.1 Chlorophenoxy Herb 525.2 SOCs 531.1 Carbamate Pesticide	SOC Packa Analyzed I Analyzed I Analyzed I Analyzed I	ge by WML by WML		EPA 524.2 EPA 515.1 EPA 525.2 EPA 531.1	12/24/08 1/ 8/09 12/31/08 1/ 8/09	

Approved By: they Kanoun

Cascade Analytical uses procedures established by EPA, AOAC, APRA, ASTM, and AVMA. Cascade Analytical makes no varranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.



(509) 662-1898 Fax: (509) 662-8189 3019 G.S. Center Road Wenatchee, WA 98801

(509) 452-7707 Fax: (509) 452-7773 1008 W. Ahtanum Rd. Batch: 823942

Client: Geo Engineers, Inc

Union Gap, WA 98903 Account: 02592

Sampler: K Cassidy PO Number:

#### Analytical Services Report

Report Date: 1/19/09

Geo Engineers, Inc Jon Rudders 523 E 2nd Ave Spokane, WA 99202

Laboratory Number: 08-C024296 Sample Identification: RI MW 01 Date Received: 12/15/08

Date Sampled: 12/15/08

lest Requested	Results	Units	MDL	Method	Date Analyzed	Flage
	000 0		****			
SOC Package	SOC Packa	ge ·				
524.2 VOC Method Drink W	Analyzed	by WML		EPA 524.2	12/24/08	
515.1 Chlorophenoxy Herb	Analyzed	by WML		EPA 515.1	1/ 8/09	•
525.2 SOCs	Analyzed	by WML		EPA 525.2	12/31/08	
531.1 Carbamate Pesticide	Analyzed'	by WML		EPA 531.1	1/ 8/09	

Approved By:

Cascade Analytical uses procedures established by EPA, ADAC, APBA, ASTM, and AWWA. Cascade Analytical makes no warranty of any kind the client assumes all risk and liability from the use of these results. Cascade Analytical, Inc.'s liability to the client as a result of use of Cascade's test results shall be limited to a sum equal to the fees paid by the client to Cascade Analytical, Inc. for analysis.

1008 W. Ahtanum Rd. Union Gap, WA 98903 (509) 452-7707 Fax: (509) 452-7773



3019 G.S. Center Rd. Wenatchee, WA 98801 (509) 662-1888 Fax: (509) 662-8183

Send Results to:	laana ta maa ay yarint waasta	Billing Address:
This is your address label, pl	1	1 30 1
Name	Join Redders	Name Name
523 E 2 7 Av	<u>e</u>	523 22 Ave 1/9/4
Street Address Specime, WA 777	<b>ડ</b> હ્ય	Street Address  Street Address  GG202
City, State, Zip		City, State, Zip
185 766 -010 Phone #	-	Fax #
Drinking	g Water Sample Inforn	nation (WSI) for Chemical Analysis
(1) System Name:	(2) WFI System ID	(3) Source # (4) Class (5) County  MWO A B
(6) Source Type (circle one	Well field Sprin	and the second s
(7) Utility Name for this So (8) Sample Taken (circle of		After treatment
(9) Treatment Type (circle of		Atter treatment
and the second of the second o	***************************************	idation Chlorination Aeration
Water Softener	Ozone UV li	ght Other
(11) Collected by (13) Location of (14) Sample sub	y: 14. Councly specific sample site: 4T mitted for approval of new s	Time of Collection 2 : 50 a.m. / p.m.  Telephone (785) 766 O110  HWOL- 17508  ource? (circle one) Yes No  Yes No Fax No Yes \$5.00 Prepaid Fee
Comments: (15)	No <sub>3</sub> Pb/Cu	IOC Other
SUC 515.2, SOC	525.2, SOC 531.1	UOC 524.Z
• • • • • • • • • •	For Labora	atory Use Only
Lab Sample #		Received Date Analyzed
Sample submitted for (circ		, (1)
<ol> <li>Regular monitoring</li> <li>Verification</li> </ol>	2) Follow-up 4) Confirmat	of lab sample #ion
Sample Preservation: (circ 1) 4°C 2) pH2	le one): 3) VOC / Ascorbic Ac	cid 4) SOC / Sodium thiosulfate
Lab Comments:		
Customer Signature	2 A	Date: 12-15-08

#### SYNTHETIC ORGANIC CHEMICALS (SOC's) ANALYSIS REPORT EPA TEST METHOD - 531.2

System ID	No.: N/A	System Name: City of Roc	k Island			
Lab/Samp	ole No.: 08987632	Date Collected	: 12/15/08	B DOH Source No.:		
Multiple S	ource Nos.: N/A		Sample Typ	pe: B	Sample Purpose: I	
Date Rece	eived: 12/17/08	Date Reported: 01/09/09		Supervisor	: I)MA	
Date Extra	acted: N/A	Date Analyzed: 01/08/09		Analyst: El	RB	
County: [	Douglas		Gro	oup: Private		
Sample Lo	ocation: MW # 1					
Send To:	Cascade Analytical, Inc 3019 GS Center Rd Wenatchee, WA 98801			Remarks:	08C-24296	

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCE	EDS
100.00		EPA REGULATED					Trigger?	MCL?
146	Carbofuran	ND	ug/L	2.0	2.0	40	NO	NO
148	Oxamyl	ND	ug/L	4.0	4.0	200	NO	NO
		EPA UNREGULATED						SELECTION OF
141	3 - Hydroxycarbofuran	ND	ug/L	2.0	2.0		NO	
142	Aldicarb	ND	ug/L	1.0	1.0		NO	
143	Aldicarb Sulfone	ND	ug/L	0.7	0.7		NO	
144	Aldicarb Sulfoxide	ND	ug/L	1.8	1.8		NO	
145	Carbaryl	ND	ug/L	2.0	2.0		NO	
147	Methomyl	ND	ug/L	1.0	4.0		NO	-
	оп	HER COMPOUNDS (OPTION	www.company.com/company.com/	81 8 7 7 1 8 1 8 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				<del>grand to the</del> Angli
326	Baygon	ND	ug/L	1.0				
327	Methiocarb	ND	ug/L	4.0				

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may need to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office. NA (Not Analyzed): In the RESULTS column indicates this compound was not included in the current analysis.

ND (Not Detected): In the RESULTS column indicates this compound was analyzed and not detected at a level greater than

the SRL.

< : Indicates less than.

Comments:

Method 531.2: CARBAMATES

#### SYNTHETIC ORGANIC CHEMICALS (SOC's) ANALYSIS REPORT EPA TEST METHOD - 515.1

System ID No.: NA	System Name: City of Roc	System Name: City of Rock Island				
Lab/Sample No.: 08987632	Date Collected:	12/15/08	DOH Source No.: NA			
Multiple Source Nos.: N/A		Sample Type: B	Sample Purpose: I			
Date Received: 12/17/08	Date Reported: 12/24/08	Super	visor: WMA			
Date Extracted: 12/17/08	Date Analyzed: 12/23/08		st: WMA			
County: Douglas		Group: Priv	ate			
Sample Location: Monitoring W	'ell # 1					
Send To: Cascade Analytical, I	nc.	Rema	rks: 08C-24296			
3019 G.S. Center Rd						
Wenatchee, WA 988	301					

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCE	EDS
		EPA REGULATED					Trigger?	MCL?
37	2,4 - D	ND	ug/L	0.2	0.2	70	NO	NO
38	2,4,5 - TP (Silvex)	ND	ug/L	0.4	0.4	50	NO	NO
134	Pentachlorophenol	ND	ug/L	0.08	0.08	1	NO	NO
137	Dalapon	ND	ug/L	2.0	2.0	200	NO	NO
139	Dinoseb	ND	ug/L	0.4	0.4	7	NO	NO
140	Picloram	ND	ug/L	0.2	0.2	500	NO	NO
		EPA UNREGULATED						
138	Dicamba	ND	ug/L	0.2	0.2		NO	
vijnesu. Likali		STATE UNREGULATED						rigina na mana
135	2,4 - DB	ND	ug/L	1.0	1.0		NO	
136	2,4,5 - T	ND ND	ug/L	0.4	0,4		NO	
220	Bentazon	ND	ug/L	0.5	0.5		NO	
221	Dichlorprop	ND	ug/L	0.5	0.5		NO	
223	Acifluorfen	ND	ug/L	2.0	2.0		NO	
225	DCPA acid metabolites (A)	ND	ug/L	0.1	0.1		NO	
226	3,5 - Dichlorobenzoic Acid	ND	ug/L	0.5	0.5		NO	
<u>Al</u> kik	ITO	IER COMPOUNDS (Option	onal)					organisa and and and and and and and and and an
224	Chloramben	ND ND	ug/L	0.2				
228	4 - Nitrophenol	ND	ug/L	0.2				

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): in the RESULTS column indicates this compound was not included in the current analysis.

ND (Not Detected): In the RESULTS column Indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

< : Indicates less than.

Comments:

Method 515.1: Herbicides

### VOLATILE ORGANIC CHEMICALS (VOC's) ANALYSIS REPORT EPA TEST METHOD - 524,2

System ID No.: N/A	System Name: City of Rock Island					
Lab/Sample No.: 08977417	Date Collected	Date Collected: 12/15/2008 DOH Source		DOH Source No.: N/A		
Multiple Source Nos.: N/A		Sample Type: B		Sample Purpose: I		
Date Received: 12/17/2008	Date Analyzed: 12/22/2	2008	Analyst: l	LHL		
	Date Reported: 12/24/2	ported: 12/24/2008 Supervisor: Lyf		or: Lyd		
County: Douglas		Group: N	I/A			
Sample Location: MW #1						
Send To: Cascade Analytical Inc.			Remarks	: 08C-24296		
3019 G.S. Center Road						
Wenatchee, WA 98801						

DOH#	ANALYTES	RESULTS	UNITS	SRL.	TRIGGER	MCL	EXCEED	S
		EPA REGULATED					Trigger?	MCL?
45	Vinyl Chloride	ND	ug/L	0.5	0.5	2	NO	NO
46	1,1 - Dichloroethylene	ND	ug/L	0.5	0.5	7	NO	NO
47	1,1,1 - Trichloroethane	ND	ug/L	0.5	0.5	200	NO	NO
48	Carbon Tetrachloride	ND	ug/L	0.5	0.5	5	NO	NO
49	Benzene	ND	ug/L	0.5	0.5	5	NO	NO
50	1,2 - Dichloroethane	ND	ug/L	0.5	0.5	5	NO	NO
51	Trichloroethylene	ND	ug/L	0.5	0.5	5	NO	NO
52	1,4 - Dichlorobenzene	ND	ug/L	0.5	0.5	75	NO	NO
56	Dichloromethane	ND	ug/L	0.5	0.5	5	NO	NO
57	trans-1,2 - Dichloroethylene	ND	ug/L	0.5	0.5	100	NO	NO
60	cis-1,2 - Dichloroethylene	ND	ug/L	0.5	0.5	70	NO.	NO
63	1,2 - Dichloropropane	ND	ug/L	0.5	0.5	5_	NO	NO
66	Toluene	ND	ug/L	0.5	0.5	1000	NO	NO
67	1,1,2 - Trichloroethane	ND	ug/L	0.5	0.5	5	МО	NO
68	Tetrachloroethylene	ND	ug/L	0.5	0.5	5	NO	NO
71	Chlorobenzene	ND	ug/L	0.5	0.5	100	NO	NO
73	Ethylbenzene	ND	ug/L	0.5	0.5	700	NO	NO
76	Styrene	ND	ug/L	0.5	0.5	100	NO	NO
84	1,2 - Dichlorobenzene	ND	ug/L	0.5	0.5	600	NO	NO
95	1,2,4 - Trichlorobenzene	ND	ug/L	0.5	0.5	70	NO	NO
160	Total Xylenes	ND	ug/L	0.5	0.5	10000	NO	NO
74	m/p Xylenes (MCL for Total)	ND	ug/L	0.5	0.5		NO	
75_	o - Xylene (MCL for Total)	ND	ug/L	0.5	0.5		NO	
		EPA UNREGULATED						
27	Chloroform	3.0	ug/L	0.5	0.5		YES	
28	Bromodichloromethane	1.9	ug/L	0.5	0.5		YES	
29	Chlorodibromomethane	1.4	ug/L	0.5	0.5		YES	
30	Bromoform	ND	ug/L	0.5	0.5		NO	
53	Chloromethane	ND	ug/L	0.5	0.5		NO	
54	Bromomethane	ND	ug/L	0.5	0.5		NO	
55	Chloroethane	ND	ug/L	0.5	0.5		NO	

Lab/Sample No.: 08977417

Water Management Laboratories, Inc. 1515 80th St. E. Tacoma, WA 98404 (253) 531-3121

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEED	S
	EP	A UNREGULATED (Contil	rued)				Trigger?	MCL?
58	1,1 - Dichloroethane	ND _	ug/L	0.5	0.5		NO _	
59	2,2 - Dichloropropane	ND	ug/L	0.5	0.5		NO	
62	1,1 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
64	Dibromomethane	ND	ug/L	0.5	0.5		NO	
70	1,3 - Dichloropropane	ND	ug/L	0.5	0.5		NO	
72	1,1,1,2 - Tetrachlroroethane	ND	ug/L	0.5	0.5		_ NO	
78	Bromobenzene	ND	ug/L	0.5	0.5		NO	
79	1,2,3 - Trichloropropane	ND	ug/L	0.5	0.5		NO	
80	1,1,2,2 - Tetrachloroethane	ND	ug/L	0.5	0.5		NO	
81	o - Chlorotoluene	ND	ug/L	0.5	0.5		NO	
82	p - Chlorotoluene	ND	ug/L	0.5	0.5		NO	
83	m - Dichlorobenzene	ND	ug/L	0.5	0.5		NO	
154	1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
		STATE UNREGULATED						
65	cis-1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
69	trans-1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
85	Fluorotrichloromethane	ND	ug/L	0.5	0.5		NO	
86	Bromochloromethane	ND	ug/L	0.5	0.5		NO	
87	Isopropyibenzene	ND	ug/L	0.5	0.5		NO	
88	n - Propylbenzene	ND	ug/L	0.5	0.5		NO	
89	1,3,5 - Trimethylbenzene	ND	ug/L	0.5	0.5		NO	
90	t - Butylbenzene	ND	ug/L	0.5	0.5		_ NO	
91	1,2,4 - Trimethylbenzene	ND	ug/L	0.5	0.5		NO	
92	s - Butylbenzene	ND	ug/L	0.5	0.5		NO	
93	p - Isopropyltoluene	ND	ug/L	0.5	0.5		NO	
94	n - Butylbenzene	ND	ug/L	0.5	0.5		NO	
96	Napthalene	ND	ug/L	0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/L	0.5	0.5		NO	
98	1,2,3 - Trichlorobenzene	ND	ug/L	0.5	0.5		NO	
102	EDB (Confirm by 504.1)	ND	ug/L	0.5	0.5		NO	
103	DBCP (Confirm by 504.1)	ND	ug/L	0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/L	0.5	0.5		NO	
N/A	MTBE	ND	ug/L	0.5	0.5		NO	

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may need to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): In the RESULTS column indicates this compound was not included in the current analysis.

ND (Not Detected): In the RESULTS column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL. <: Indicates less than.

#### Comments:

A maximum contaminant level of 80 ug/L total Trihalomethanes (Compounds 27-30) is allowed.

Method 524.2: VOC's

# SYNTHETIC ORGANIC CHEMICALS (SOC's) ANALYSIS REPORT EPA TEST METHOD - 525.2

System ID No.: NA	System Name: City of Ro	ck Island		
Lab/Sample No.: 08987632	Date Collected	d: 12/15/08	5/08 DOH Source No.	
Multiple Source Nos.: N/A		Sample Type	e: B	Sample Purpose: I
Date Received: 12/19/08	Date Reported: 12/31/08		Superviso	or: Wint
Date Extracted: 12/22/08	Date Analyzed: 12/31/08			VMA
County: Douglas	<del></del>			
Sample Location: Monitoring \	Well # 1			
Send To: Cascade Analytical,	Inc.		Remarks:	08C - 24296
3019 G.S. Center Rd			ļ.	
Wenatchee, WA 988	01			

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXC	EDS
		EPA REGULATED					Trigger?	MCL?
33	Endrin	ND	ug/L	0.02	0.02	2	NO	NO
34	Lindane (HCH gamma)	ND	ug/L	0.04	0.04	0.2	NO	NO
35	Methoxychlor	ND	ug/L	0.2	0.2	40	NO	NO
36	Toxaphene	ND	ug/L	2	2	3	NO	NO
117	Alachlor	ND	ug/L	0.4	0.4	2	NO	NO
119	Atrazine	ND	ug/L	0.2	0.2	.3	NO	NO
120	Benzo(a)pyrene	ND	ug/L	0.04	0.04	0.2	NO	NO
122	Chlordane (total)	ND	ug/L	0.4	0.4	2	NO	NO
124	Di(ethylhexyl)adipate	ND	ug/L	1.3	1.3	400	NO	NO
125	Di(ethylhexyl)phthalate	ND	ug/L	1.3	1.3	6	NO	NO
126	Heptachlor	ND	ug/L	0.08	0.08	0.4	NO	NO
127	Heptachlor epoxide	ND	ug/L	0.04	0.04	0.2	NO	NO
128	Hexachlorobenzene	ND	ug/L	0.2	0.2	1	NO	NO
129	Hexachlorocyclopentadier	ne ND	ug/L	0.2	0.2	50	NO	NO
133	Simazine	ND	ug/L	0.15	0.15	4	NO	МО
134	Pentachlorophenol	ND	ug/L	0.08	0.08	1	NO	NO
		EPA UNREGULATED						
	Aldrin	ND	ug/L	0.2	0.2		NO	
	Butachior	ND	ug/L	0.4	0.4		NO	
	Dieldrin	ND	ug/L	0.2	0.2		NO	
	Metolachior	ND	ug/L	1	11		NO	
	Metribuzin	ND	ug/L	0.2	0.2		NO	
132	Propachlor	ND	ug/L	0.2	0.2		NO	
154	Fluorene	ND	ug/L	0.2	0.2		NO	
		STATE UNREGULATED						
	PCB (as total arochlors)	ND	ug/L	0.2	0.2		NO	
	Arochlor 1221	ND	ug/L	0.5	0.5		NO	
	Arochlor 1232	ND	ug/L	0.1	0.5		NO	
	Arochlor 1242	ND	ug/L	0.1	0.3		NO	
176	Arochlor 1248	ND	ug/L	0.1	0.1		NO	

#### Lab/Şample No.: 08987632

Water Management Laboratories, Inc.

1515 80th St. E. Tacoma, WA 98404 (253) 531-3121

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCE	EDS
		STATE UNREGULATED					Trigger?	MCL?
177	Arochlor 1254	ND	ug/L	0.1	0.1		NO	
178	Arochlor 1260	ND	ug/L	0.1	0.2		NO	
179	Bromacil	ND	ug/L	0.2	0.2		NO	
180	Arochlor 1016	ND	ug/L	0.2	0.2		Ю	
_183	Prometon	ND	ug/L	0.2	0.2		NO	
190	Terbacil	ND	ug/L	0.2	0.2		NO	
202	Diazinon	ND	ug/L	0.2	0.2		NO	
208	EPTC	. ND	ug/L	0.3	0.3		NO	
230	Heptachlor Epoxide 'B'	NA	ug/L	0.2	0.2			_
232	4,4' - DDD	ND	ug/L	0.2	0.2		NO	
233	4,4' - DDE	ND	ug/L	0.2	0.2		NO	
234	4,4' - DDT	ND	ug/L	0.2	0.2		NO	
236	Cyanazine	ND	ug/L	0.2	0.2		NO	
239	Malathion	ND	ug/L	0.2	0.2		NO	
240	Parathion	ND	ug/L	0.2	0.2		NO	
243	Trifluralin	ND	ug/L	0.2	0.2		NO	
244	Acenaphthylene	ND	ug/L	0.2	0.2		NO	
245	Acenaphthene	ND	ug/L	0.2	0.2		NO	
246	Anthracene	ND	ug/L	0.2	0.2		NO	
247	Benzo (a) Anthracene	ND	ug/L	0.2	0.2		NO	
248	Benzo (b) Fluoranthene	ND	ug/L	0.2	0.2		NO	
249	Benzo (g,h,i) Perylene	ND	ug/L	0.2	0.2		NO	
250	Benzo (k) Fluoranthene	ND	ug/L	0.2	0.2		NO	
251	Chrysene	ND	ug/L	0.2	0.2		NO	
	Dibenzo (a,h) Anthracene	ND	ug/L	0.2	0.2		NO	
253	Fluoranthene	ND	ug/L	0.2	0.2		NO	
	Indeno (1,2,3-cd) Pyrene	ND	ug/L	0.2	0.2		NO	
	Phenanthrene	ND	ug/L	0.2	0.2		NO	
	Pyrene	ND	ug/L	0.2	0.2		NO	
	Benzyl Butyl Phthalate	ND	ug/L	0.6	0.6		NO	
	Di - n -Butyl Phthalate	ND	ug/L	0.6	0.6		NO	
	Diethyl Phthalate	ND	ug/L	0,6	0.6		NO	
	Dimethyl Phthalate	ND	ug/L	0.6	0.6		NO	
	Heptachlor Epoxide 'A'	NA	ug/L	0.2	0.2			
	Acetochlor	ND	ug/L					
	Molinate	ND	ug/L					
	2,4-Dinitrotoluene	ND	ug/L					
	2,6-Dinitrotoluene	ND	ug/L					

#### NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): In the RESULTS column Indicates this compound was not Included in the current analysis.

ND (Not Detected):In the RESULTS column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

Comments: Sample was analyzed in accordance with DOH memo dated 03/04/98.

Method 525: Pesticides

WHITE - Bubmit with sample, YELLOW - Client Copy, PINK - Laboratory Copy

AGRICULTURE & · ENVIRONMENTAL ANALYSIS

> (509) 662-1868 Fax: (509) 662-8183 3019 G.S. Conlet Road Wonatches, WA 98801

(509) 452-7707 Fax: (509) 452-7773

## Sub-Contract ORDER FORM

RONO 8739421211/C

1-800-545-4206	1008 W. Ahia uum Rd, Union Gap, Wa 98803		P. J. NO. 0 22	71-19
PROJECT NAME	1K TS/AMD ADDRE	TATE ZIP	ATOR MONAGEMENT LAS 158048E. ACOMA, UA DEGLOG	gs /
RELINQUISHED BY: SIgnature E	- 1. / 1	] DATE	RELINQUISHED BY: Signature [장	DATE
(Printed)	TIME (Printed)	TME	(Printed)	TIME
RECEIVED BY: Signature	DATE RECEIVED BY Signature	DATE	RECEIVED BY: Signature	DATE
(Printed) L Palsson	TIME (Printed)	ME	(Printed)	TIME
ANALYSIS REQUESTED  COMMENT () N.C. \DU  Sample I.D. \BC -  ANALYSIS REQUESTED  COMMENT FR S  Sample I.D	84296 = 17W#1 VOC 524,2 + SOE PKg the for 515.2 received 84319 = 17W#2 180 524.2 + 5xc PKg or 525 received broken	(cetler	W1525,531,524	"Sopin not rord"
COMMENT Sample I.D. ANALYSIS REQUESTE COMMENT	RECEIVED IN COOLER W/IC VIA UPS - WML	E _	Sample Date Semple Tim	8
SPECIAL INSTRUCTIONS:	Results & Billing to	CA9-]	Worksthee	
	Du Not Report	zluri Esibe	New Wells	

## Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

**GEO ENGINEERS** 

Address:

523 E 2ND

SPOKANE, WA 99202

Attn:

JON RUDDERS

Batch #:

090203012

Project Name:

16399-001-03

#### **Analytical Results Report**

Sample Number Cilent Sample ID 090203012-001 MW-1-020209

Sampling Date Sampling Time 2/2/2009 1:05 PM

Date/Time Received

2/3/2009

9:52 AM

Matrix

Water

Sample Location

**Extraction Date** 

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Arsenic	0.00618	mg/L	0.001	2/9/2009	DMB	EPA 200.8	
Dissolved Arsenic	0.00551	mg/L	0.001	2/9/2009	DMB	EPA 200.8	
Dissolved Iron	ND	mg/L	0.01	2/9/2009	DMB	EPA 200.8	
Dissolved Manganese	ND	mg/L	0.001	2/9/2009	DMB	EPA 200.8	
Iron	0,167	mg/L	0.01	2/13/2009	DMB	EPA 200.8	
Manganesė	0.0124	mg/L	0.001	2/9/2009	DMB	EPA 200.8	

Sample Number Client Sample ID 090203012-002 MW-3-020209

Water

Sampling Date Sampling Time

2/2/2009 2:30 PM Date/Time Received 2/3/2009

9:52 AM

**Extraction Date** 

Sample Location

Matrix Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Arsenic	0.00177	mg/L	0.001	2/9/2009	DMB	EPA 200.8	
Dissolved Arsenic	0.00191	mg/L	0.001	2/9/2009	DMB	EPA 200.8	
Dissolved Iron	0.0126	mg/L	0.01	2/9/2009	DMB	EPA 200.8	
Dissolved Manganese	0.106	mg/L	0.001	2/9/2009	DMB	EPA 200.8	
Iron	0.241	mg/L	0.01	2/13/2009	DMB	EPA 200.8	
Manganese	0.110	mg/L	0.001	2/9/2009	DMB	EPA 200.8	

**Authorized Signature** 

Kathlein a. Sattles

MCL

EPA's Maximum Contaminant Level

ND PQL Not Detected

Practical Quantitation Limit

Centifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C1320 Centifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C1287

Tuesday, February 17, 2009

Page 1 of 1

## Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D · Spokane WA 99202 · (609) 838-3999 · Fax (509) 838-4433 · email spokane@anateklabs.com

Client:

**GEO ENGINEERS** 

Address:

523 E 2ND

SPOKANE, WA 99202

Attn:

JON RUDDERS

Batch #:

090203012

**Project Name:** 

16399-001-03

#### **Analytical Results Report**

Sample Number Client Sample ID 090203012-001 MW-1-020209

Sampling Date Sampling Time

2/2/2009 1:05 PM

Date/Time Received

**Extraction Date** 

2/3/2009

9:52 AM

Matrix

Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifler
Bromodichioromethane	ND	ug/L	0.5	2/6/2009	WOZ	EPA 524.2	
Bromoform	ND	ug/L	0.5	2/6/2009	WOZ	EPA 524.2	
Chloroform	0.62	ug/L	0.5	2/6/2009	WOZ	EPA 524.2	
Dibromochloromethane	ND	ug/L	0.5	2/6/2009	WOZ	EPA 524.2	
Total Trihalomethane	0.62	ug/L	0.5	2/6/2009	woz	EPA 524.2	

**Authorized Signature** 

Kathlein a. Sottler

MCL

EPA's Maximum Contaminant Level

Not Detected

PQL

Practical Quantitation Limit

## Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D · Spokane WA 99202 · (609) 838-3999 · Fax (509) 838-4433 · email spokane@anateklabs.com

#### **Login Report**

**Customer Name: GEO ENGINEERS** 

Order ID:

090203012

523 E 2ND

**Order Date:** 

2/3/2009

SPOKANE

WA

99202

**Contact Name: JON RUDDERS** 

Project Name: 16399-001-03

Comment: BILL TO ROCK ISLAND / REPORT TO GEO

Sample #;

090203012-001

Customer Sample #:

Water

MW-1-020209

2/2/2009

Recv'd: Quantity:

Collector: Matrix:

KATE CASSIDY

**Date Collected:** Date Received:

2/3/2009 9:52:00 AM

Comment:

Test	Test Group	Method	Due Date	Priority
ARSENIC		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED ARSENIC		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED IRON		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED MANGANESE		EPA 200.8	2/13/2009	Normal (6-10 Days)
IRON		EPA 200.8	2/13/2009	Normal (6-10 Days)
MANGANESE		EPA 200.8	2/13/2009	Normal (6-10 Days)
THM - TOTAL 524.2		EPA 524.2	2/13/2009	Normal (6-10 Days)

Sample #:

090203012-002

Customer Sample #:

MW-3-020209

Recv'd:

Collector: KATE CASSIDY

**Date Collected:** 

2/2/2009

Quantity:

Matrix: Water Date Received:

2/3/2009 9:52:00 AM

Comment:

HOLD TTHM SAMPLE ONLY

Test	Test Group	Method	Due Date	Priority
ARSENIC		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED ARSENIC		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED IRON		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED MANGANE	SE	EPA 200.8	2/13/2009	Normal (6-10 Days)
HOLD		hold	2/2/2009	Normal (6-10 Days)
IROŅ		EPA 200.8	2/13/2009	Normal (6-10 Days)
MANGANESE		EPA 200.8	2/13/2009	Normal (6-10 Days)
THM - TOTAL 524.2		EPA 524.2	2/13/2009	Normal (6-10 Days)

**Customer Name: GEO ENGINEERS** 

Order ID:

090203012

523 E 2ND

WA

Order Date:

2/3/2009

SPOKANE

99202

**Contact Name: JON RUDDERS** 

Project Name: 16399-001-03

Comment: BILL TO ROCK ISLAND / REPORT TO GEO

Sample #: 090203012-003 Customer Sample #: DUP-020209

Collector: KATE CASSIDY

Date Collected: 2/2/2009

Recv'd: Quantity:

Matrix:

Water

Date Received: 2/3/2009 9:52:00 AM

Comment: HOLD ALL ANALYSES

Test	Test Group	Method	Due Date	Priority
ARSENIC		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED ARSENIC		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED IRON		EPA 200.8	2/13/2009	Normal (6-10 Days)
DISSOLVED MANGANESE		EPA 200.8	2/13/2009	Normal (6-10 Days)
HOLD		hold	2/2/2009	Normal (6-10 Days)
IRON		EPA 200.8	2/13/2009	Normal (6-10 Days)
MANGANESE		EPA 200.8	2/13/2009	Normal (6-10 Days)
THM - TOTAL 524.2		EPA 524.2	2/13/2009	Normal (6-10 Days)

#### SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	5.5
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	Yes
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes



#### Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246 504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433 (208) 883-2839 (208) 883-28

Company Name: Greo Engineer ((NEI)				Project Manager: Son Ruddles							16399-001-03					
Addres	523 E	= 2	W And		Project Name & #: 10399-001-03										http://www.anateklabs.com/services/guidelines/reporting.asp	
Address: 523 E ZW Are City: Spakane State: WA 99202				Email Address:								XNormal *All rush orderPhone Next Day* requests must beMail				
Phone	509 3	(03	-3125			Purchase Order #:									2nd Day* prior approvedFax	
Fax:					Sam	Sampler Name & phone: Wate Cassida, 785 766-046									Other*Email	
	Provid	e Sa	mple Description					List	Analys	ses Re	que	ted			Note Special Histractions/Confinents	
					# of Containers	Sample Volume	Total Ferth, Ri	Joseph Fertneth	5 47.7 TE						Direct Bill to "Hayer Russell Clark  AD Box 99  AD Box 99  AD Box 99  A Dissolved Metal Rock Island, WA  Samples were filtered in 198850  He In old se	
Lab	Sample Identifica	ition	Sampling Date/Time	Matrix	# of C	Samp	Tota	12.52 17.92	THMS EAA						He mold & 19850	
	MW-1-0202	ros	2-2-09 1305	(n)	6	660	1	1	1						-	
2			2-2-09 1430	GW	8	1160	1	_	\						Hold THM Sandes.	
- 23	DUE-0202	09	2-2-09 1100	(n \)	6	660	1	1	/						Hold for analysis	
															:	
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10000					_										GAMBE Metals-m	
31/92					_		_									
					_					$\perp$	-				Inspection Checklist	
					_	-	_	_			-	$\perp$			Received Intact? N	
		_			_	-	_	_	-		-		_	-	Labels & Chains Agree?	
					_	-	-				-	-	_		Containers Sealed? Y N	
					_	-	_	_	-		-	$\vdash$	-		VOC Head Space? Y (N)	
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200000		-		Signature	_		668608		Compa	ny.		Date	CONSCIONA	ne		
Relin	quished by	140	de Cassidy	MY?		/	<u> </u>		( Neo	Engrap	310	7-3-	09 0	152	Temperature (°C): 55	
Received by Fauth 1			al	2	_		ar	aller	E	2/3	109	95	Preservative: NaThro			
Relinquished by					,					<u> </u>						
Rece	ived by						:								Date & Time: 2-3-89	
Relin	quished by												_		Inspected By: #//3	
Rece	eived by						*	-								

3



# APPENDIX E REPORT LIMITATIONS AND GUIDELINES FOR USE

## APPENDIX E REPORT LIMITATIONS AND GUIDELINES FOR USE<sup>1</sup>

This appendix provides information to help you manage your risks with respect to the use of this report.

## HYDROGEOLOGIC SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for use by Varela & Associates and the City of Rock Island. This report may be made available in its entirety to others for information only. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a hydrogeologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each hydrogeologic study is unique, each hydrogeologic report is unique, prepared solely for the specific client and project site. No one except Varela & Associates and the City of Rock Island should rely on this report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

#### A Hydrogeologic Report Is Based On A Unique Set Of Project-Specific Factors

This report has been prepared for the City of Rock Island production well system. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

#### SUBSURFACE CONDITIONS CAN CHANGE

This hydrogeologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

<sup>&</sup>lt;sup>1</sup> Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.



#### MOST HYDROGEOLOGIC FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

#### A HYDROGEOLOGIC REPORT COULD BE SUBJECT TO MISINTERPRETATION

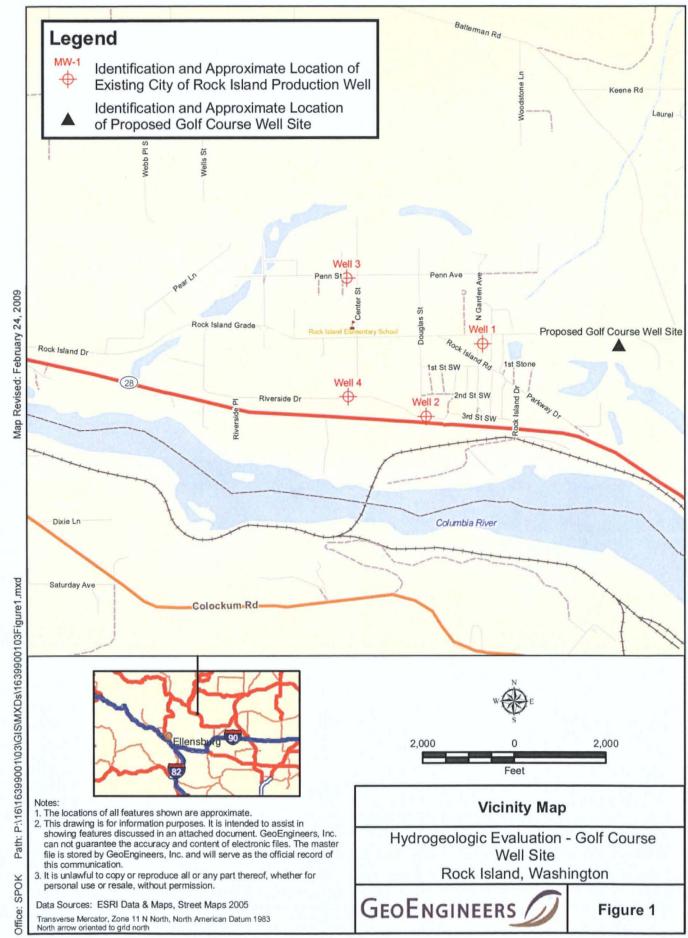
Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a hydrogeologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

#### DO NOT REDRAW THE EXPLORATION LOGS

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

#### **READ THESE PROVISIONS CLOSELY**

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or hydrogeology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.







1. The locations of all features shown are approximate.

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Data Sources: ESRI I3 Imagery (NAIP 2006), Douglas County roads 2006

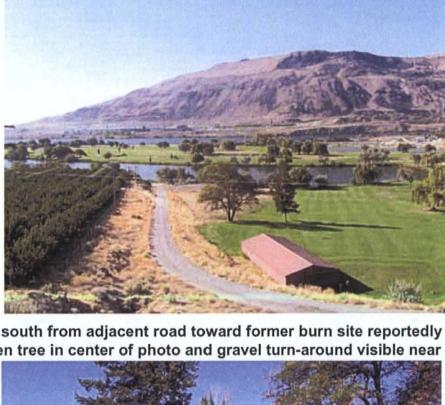
Transverse Mercator, Zone 10 N North, North American Datum 1983 North arrow oriented to grid north

# 250

#### **Observed Features Environmental Review**

Hydrogeologic Evaluation - Golf Course Well Site Rock Island, Washington





Looking south from adjacent road toward former burn site reportedly located between tree in center of photo and gravel turn-around visible near water

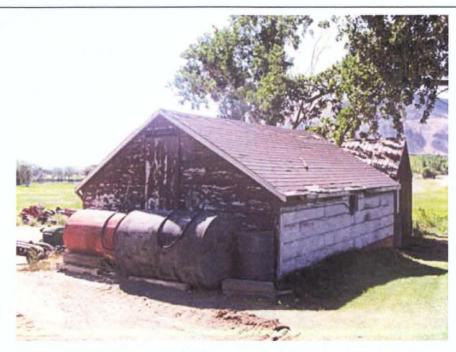


Looking west toward golf course clubhouse former burn site reportedly located in photo foreground

Site Photographs - September 2008

Hydrogeologic Evaluation - Gold Course Well Site Rock Island, Washington





Looking south at golf course maintenance shed fuel ASTS visible; reported UST formerly located along white wall of shed

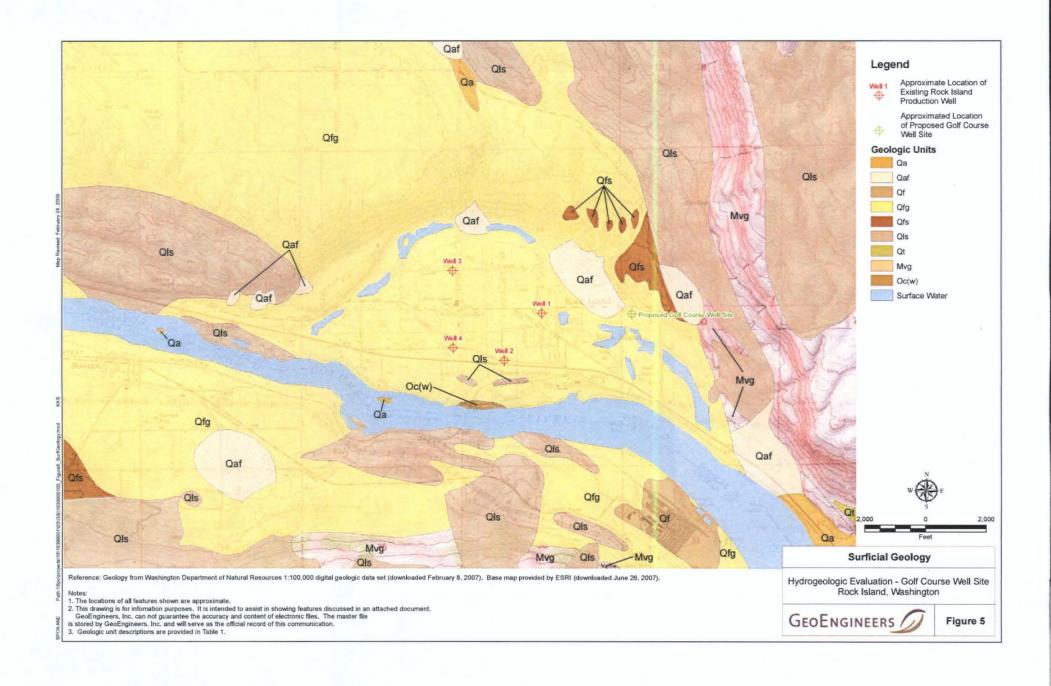


Looking north toward proposed well site in middle distance west end of golf course

Site Photographs - September 2008

Hydrogeologic Evaluation – Gold Course Well Site Rock Island, Washington



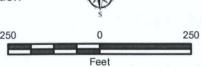




MW-2



Monitoring Well Identification and Approximate Location



- Notes:

  1. The locations of all features shown are approximate.

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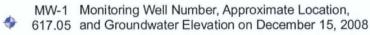
Data Sources: ESRI I3 Imagery (NAIP 2006), Douglas County roads 2006 Transverse Mercator, Zone 10 N North, North American Datum 1983 North arrow oriented to grid north

#### **Monitoring Well Locations**

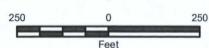
Hydrogeologic Evaluation - Golf Course Well Site Rock Island, Washington







Approximate Groundwater Flow Direction



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#### **Groundwater Elevations** December 15, 2008

Hydrogeologic Evaluation - Golf Course Well Site Rock Island, Washington





APPENDIX A
ENVIRONMENTAL DATA RESOURCES, INC. REPORT

Rock Island Golf Course 314 Saunders Road Rock Island, WA 98802

Inquiry Number: 2309645.2s September 04, 2008

## The EDR Radius Map™ Report with GeoCheck®



440 Wheelers Farms Road Milford, CT 06461 Toll Free: 800.352.0050 www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050 with any questions or comments.

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